COMMERCIAL Service Manual

By K. M. NEWCUM

Discharge Valve Assemblies Used On Commercial Condensing Units

CHAPTER 6—Commercial Condensing Units—Continued

Discharge Valve Assemblies

The discharge valve is one of the check valves between the high pressure side of the system and the low pressure side. It is properly labeled "discharge valve" for it is through this valve that all the refrigerant vapor is forced and discharged from the compression chamber above the piston, on each compression stroke, to the high side of the system.

Its functions are twofold. First, it maintains a seal between the high side and low side during the off-cycle, thus preventing high pressure vapor previously discharged from leaking back into cylinder chamber and the low side. In so doing, a pressure is maintained on the liquid in the liquid receiver to keep this refrigerant in its liquid state, which is most necessary in the process of mechanical refrigeration.

Second, it opens with each compression stroke of the piston and immediately closes at the completion of each compression stroke to prevent the high pressure gas from re-entering the cylinder chamber and re-expanding therein.

Types of Discharge Valves

There are two main types of discharge valves. One is the disc type very similar to the piston valve. The disc may either be the thin or thick type.

The York discharge valves shown in Fig. 45 present an interesting study in the thin disc type. The discharge valves used are exactly the same and are interchangeable with the piston valves shown in Fig. 42.

The thin Swedish steel disc is held in place in the center by the bolt and nut. Their action is in the flexing of the disc. Following the same rule as in piston valves, it is not necessary to lap a disc of this type to the valve. The valve seats should be carefully lapped on a lapping block and polished with a flat razor hone until a true unbroken polished seat is obtained.

Heavy Disc Type

The Universal Cooler discharge valve, Fig. 46, shows the heavier disc type of discharge valve. The main disc part "A" is lapped to the raised valve seat. Assembled in the cup-shaped main disc are four small thin discs, cup-shaped.

Under normal operation, the lift of the main disc is effected by the flexing action of the four thin discs or springs.

Should a slug of oil be forced through the discharge valve, requiring more area than normally required for the gas, the safety spring "B" raises to provide the greater lift necessary.

A Kelvinator disc type discharge valve is shown in Fig. 47. Note the discharge valve disc is held in place by a small spring within the confines of the valve guide. When liquid or oil is forced through the valve, the safety spring operates to provide the greater lift.

Method of Assembling

Valves of this type should always be assembled so that there is sufficient movement in the small spring to provide the life necessary in normal operation. If the small spring is completely compressed, the lift is obtained by the movement of the larger spring. Here the valve operation will be very noisy and the compressor displacement efficiency will be reduced.

The other principal type of discharge valve is the so-called flapper valve. It consists of a thin steel reed secured to the valve plate with one or both ends movable.

A Frigidaire discharge valve of the reed or flapper type is shown in Fig. 48. In this valve the valve seats are even with the face of the valve plate. When these seats become scored or pitted, resulting in a leaky valve, the plate should be lapped on a true lapping block or a piece of heavy plate

Disc Discharge Valves

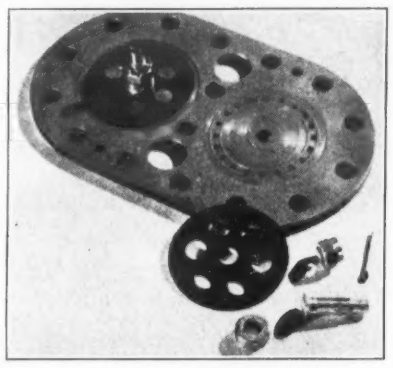

Fig. 45—York discharge valves shown are of the thin disc type.

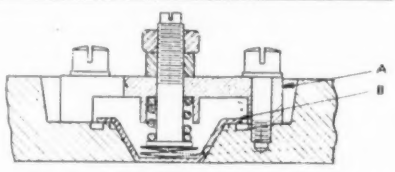

Fig. 46—Diagram of heavy disc discharge valves used by Universal Cooler.

glass with medium lapping compound until the valve seats represent an even unbroken surface.

Lap with Oscillating Motion

It is suggested that the valve plate be oscillated in a "figure 8" path during the lapping period.

When the lapping is completed the surface should be cleaned of all traces of the compound. It will be noted that the valve seats show scratch marks from the lapping compound. These marks may be removed with flat true stones. To take out the scratches a medium stone should be used.

When the scratches have been removed, the valve seats should be polished with a fine stone or razor hone. When the valve faces are polished, a new reed should be installed with the polished side against the seats.

The assembled valve may be seen in Fig. 35. Note the metal plate between the valve reed and the top valve spring. Between the spring and the plate are two Bakelite buttons. The lift of the valve reed is transmitted to the valve spring by these buttons. The metal plate in the center acts as a stop or limit for the life of the valve reed.

Frigidaire Reed or Flapper Type

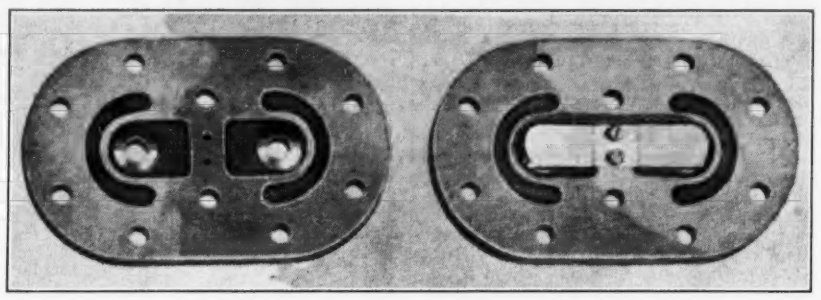

Fig. 48—Valve seats are even with the face of the valve plate in this Frigidaire reed or flapper type discharge valve.

Operation of Reed Type

The action of the valve is such that on the up stroke of the piston the higher pressure gas forces the valve reed up off the seat to allow the gas to pass. At the completion of the compression stroke the valve flaps down on the seat, hence the name "flapper valve."

Another Frigidaire flapper valve may be seen in Fig. 39. (Through an error, Figs. 38 and 39 in the Sept. 2 instalment were transposed, and the Frigidaire compressor diagram was erroneously labeled Absopure.) It consists of a spring reed which fits over the seats supported by a spiral flat spring. The action of this valve is the same as the one shown in Fig. 48, in that it flaps from the center screws by which the reed and spring are held to the plate.

Testing for Leaks

There are two methods of testing discharge valves for leaks. One is to install a compound gauge in the suction service valve at the compressor and close the valve all the way to the right, then stopping the compressor. Note the pressure or vacuum on the gauge. If it remains constant after several tests, the discharge valves are not leaking. If the pressure increases to equalize with the high side pressure, the discharge valves are leaking.

A second test may be made with a gauge in the discharge shut-off service valve. Close the discharge service valve tightly with the compressor idle. Note the pressure. If it drops to equalize with the low side pressure, the discharge valves are leaking. If the pressure remains constant with a slight allowance for cooling, the valves are not leaking.

Repairing Disc Type

A disc type valve is more easily repaired on the job than the flapper type. For example, on the disc type, a round flat steel disc with a screw driver slot and properly guided, may be used with a fine grade of lapping compound to remove the irregularities from the valve seats.

This lapping operation should be followed by a polishing operation with bon ami and oil. After all traces of the lapping and polishing compounds are removed, a new disc may be installed and the valve reassembled for test and operation. However, even with the disc type, it is often best to replace the entire plate and assembly and repair the valve in the shop.

The reed or flapper type which in most cases requires the use of a lapping block, can best be repaired in the shop.

Inspect for Oil and Carbon

Immediately upon removing the cylinder head on a job with a leaky discharge, the valve should be inspected first for traces of oil, and second for deposits of carbon or a black gummy substance.

If the discharge valve is bone dry, that is, has no traces of oil, it is evident that no oil is being circulated with the refrigerant which would indicate a shortage of oil to the crankcase.

Discharge valves, like any moving part, will wear more rapidly without lubrication. It has also been noted, that a dry discharge valve may leak where it might hold perfectly if provided with a film of oil to act as a seal.

If the valve is covered with a black gummy substance, particularly in an SO_2 compressor, the condition may be traced to moisture in the system which is affecting the oil and attacking the iron and steel parts. This condition may also be a result of improper or cheap oil not suitable for refrigeration work.

Indication of Excessive Heat

Where the formation has turned to hard carbon similar to that found in the automobile engine, it is an indication that the heat at the cylinder head is excessive. This may be due to several conditions. It is most prevalent where an air-cooled condensing unit has been operating under high head pressure and temperature.

High head pressure may be due to air in the system, too small a condenser, insufficient air circulation, dirty condenser, etc.

It is also possible to find the cylinder head of a water-cooled condensing unit carbonized. Outside of air in the system, this condition may be traced to insufficient condensing water, resulting in high head temperature and pressure.

This carbon formation is very troublesome as it breaks away and circulates with the refrigerant and oil through the system, resulting in increased wear on all moving parts, and clogged filters and strainers.

The cause of such a condition should be corrected and a highly efficient filter installed in the liquid line near the receiver to trap this free carbon.

Another reed type discharge valve is shown in Fig. 49. This Kelvinator discharge valve consists of a thin steel reed held in place at both ends by the discharge valve guides.

Immediately above the valve reed is the valve stop. Under normal operating conditions, the reed lifts up to the off-set valve stop sufficiently to allow the gas to pass.

In case of liquid or oil being forced up through the discharge valve, the reed is forced up against the valve stop which moves upward against the compression of the valve safety springs allowing a greater lift to enable the passage of the liquid or oil.

Two Types of Kelvinator Valves

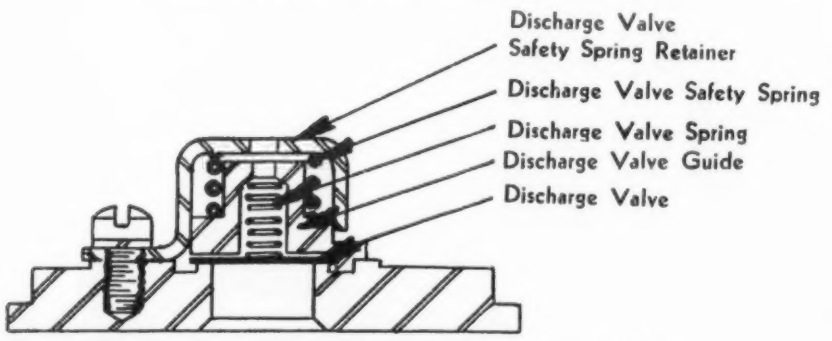

Fig. 47—Kelvinator disc-type discharge valve.

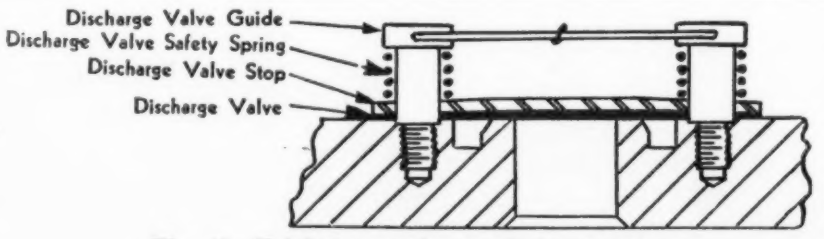

Fig. 48—Kelvinator reed-type discharge valve.

The Buyer's Guide

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In This Issue

How Does Your Profit-and-Loss Statement Compare With Others?

Each year the research and statistical division of Dun & Bradstreet, Inc., makes a survey covering the operating averages (gross profit, net profit, gross margins, various items in overhead expense) of retailers in many lines of business. Retailers of electric refrigerators and appliance dealers are covered in this survey.

Results of the fact-finding in these two fields which has just been completed by Dun & Bradstreet, covering operations in 1935, are published on page 5 of this issue. Retailers who would like to know how their markup and cost percentages on various items of overhead expense, compare with those of the average retailer, will find one answer in this survey.

A Cincinnati Survey on Refrigerator Ownership

"Which makes of refrigerators are most in use at the present time?" "In what price range have most refrigerators been sold?" "What kind of retailers sell electric refrigerators, and what particular type sell the most?"

These questions are ones which are received almost daily from readers of AIR CONDITIONING AND REFRIGERATION NEWS. No specific answers to these inquiries are available on a nation-wide basis, but every so often a survey is made of some particular segment of the U. S. population in which data covering these factors is taken.

Of such a nature is the survey of 4,740 housewives recently completed by *The Cincinnati Post*. What was found out about the relative sales of various makes, the division by price classification, and place of purchase, is told in a story on page 2 of this issue.

Start Reading This Week— 'Air Conditioning Made Easy'

On pages 12 and 13 of this issue will be found Sections 1 and 2 of *Air Conditioning Made Easy*, a book on air-conditioning engineering practice which will appear serially in AIR CONDITIONING AND REFRIGERATION NEWS.

Readers who are interested in air conditioning and who plan to follow the instalments of *Air Conditioning Made Easy* are advised to read Section 1, which is comprised of terms used throughout the book.

Detailed Statistics on Air Conditioning Sales

More data for a number of cities telling the make and size (in terms of connected horsepower and/or refrigeration tonnage) of the equipment installed, and the type of place in which it was installed. (Pages 9, 10, 11.)

NEXT WEEK

Industry Pioneer Number

In its tribute to individuals who did the pioneering in electric refrigerator engineering, production, and merchandising, AIR CONDITIONING AND REFRIGERATION NEWS will bring to light the obscure history of the early days of electric refrigeration, a knowledge of which is helpful in understanding how some things happen to be as they are.

Government Opens Bids on Ranges for Slum Projects

WASHINGTON, D. C.—Bids from five manufacturers to supply 7,802 electric ranges for 14 Federal slum clearance projects have been taken under advisement by the Public Works Administration.

Bidders and prices follow: Phillips & Buttorff Mfg. Co., Nashville, Tenn., $409,151.60; Detroit Vapor Stove, division of Borg-Warner Corp., Detroit, $316,032.05; Edison General Appliance Co., Chicago, $319,100.69; Westinghouse Electric Mfg. Co., Washington, D. C., $339,843.13; General Electric Co., Schenectady, $354,041.91.

Subjects Chosen For Speeches at Service Meeting

Entertainment and Exhibit Plans for Convention Are Released

CHICAGO—Program, entertainment, and exhibit plans have been shaped for the third annual convention of the Refrigeration Service Engineers Society to be held Nov. 11 to 13 at the Hotel Gayoso in Memphis, Tenn.

While the roster of speakers for the technical program is not ready for release, officials of the association declare that several prominent industry engineers will take part in the program. Among the subjects to be discussed are:

"How to Figure a Specified Truck Installation"; "Lubricating Oils"; "Use of Neutralizers for Refrigeration Gases When Purging, and the Use of Neutralizers in the System"; "Unit or Forced Draft Coolers"; "Conversion of Flat Belt Drives to V-Belt Drives"; "How to Figure Compressor Capacities for Various Applications"; "How to Figure a Specified Air-Conditioning Job."

The technical program will occupy the afternoon sessions of the convention.

Entertainment program for the convention opens with a party at the Colonnade night club on Wednesday night, Nov. 11. On Thursday morning the conventionites will be taken on an inspection tour of the cotton industry. The annual banquet will be

(Concluded on page 2, column 3)

Biennial Dairy Show Will Open Oct. 12

ATLANTIC CITY—The Dairy Industries Exposition, biennial showing of equipment for all phases of the great dairy industry, and claimed to be the largest exhibition staged by any single industry, opens here Monday, Oct. 12, in the Atlantic City auditorium, for a week's run.

As in past years, manufacturers of commercial and industrial refrigeration equipment and parts will have a major role with their exhibits. Refrigeration exhibits have a habit of "stealing the show" at the Dairy Industries Exposition.

The subject of refrigeration will also have a part on the program of the International Association of Ice Cream Manufacturers and the International Association of Milk Dealers, which are being held in Atlantic City the same week.

Among the new developments scheduled to be introduced at the Exposition which will be of interest to refrigeration men are the following:

A light automatic plate valve used as suction or discharge valve in ammonia compressors; float valve controls for automatic control of the liquid ammonia level on the low pressure side of refrigerating machinery; ice cream cabinets refrigerated with a plate-type evaporator; self-contained model ice cream cabinets; merchandising store equipment in the form of dairy bars; new type surface coolers; new fittings for use with flared tubing.

Following is the list of exhibitors who have already signed up to show products at the Exposition:

Anheuser-Busch, Inc.; Armstrong Cork Products Co.; The Bristol Co.; Century Electric Co.; Cherry-Burrell Corp.; Chester Dairy Supply Co.; Cork Import Corp.; Curtis Refrigerating Machine Co.; Dry Ice, Inc.; Dole Refrigerating Co.

Frick Co.; Frigidaire Corp.; Frigie Corp. of America; General Electric Co.; Grand Rapids Cabinet Co.; The E. A. Kaestner Co.; Kelvinator Corp.; Kold-Hold Mfg. Co.; Liquid Carbonic Corp.; Mack-International Truck Co.; Mathieson Alkali Works, Inc.; Meyer Body Co.; Michigan Alkali Co.; Mitchell & Smith, Inc.; Mundet Cork Corp.; Powers Regulator Co.

Robbins & Burke, Inc.; Russ Soda Fountain Co.; Refrigeration Appliances, Inc.; Savage Arms Corp.; C. J. Tagliabue Mfg. Co.; Taylor Instrument Co.; Standard Body Corp.

Vogt Processes, Inc.; Waltham System, Inc.; Waukesha Specialty Co.; York Ice Machinery Corp.

Mills Field Sales Supervisor

JOSEPH F. ROGERS

• • •

Joseph Rogers Made Mills Sales Head

CHICAGO—Appointment of Joseph F. Rogers as field sales supervisor in the new compressor division of Mills Novelty Co., Chicago, was announced last week by Ray Polley, refrigeration division manager.

Mr. Rogers has a background of 10 years of sales supervision for leading refrigerator distributors in Chicago, and until recently was connected with Northtown Refrigeration Corp., Frigidaire distributor.

Mr. Rogers will be located for the present in the Chicago office of the Mills compressor division.

Leonard to Expand Grand Rapids Factories

GRAND RAPIDS, Mich.—Expansion of Leonard Refrigerator Co. plant facilities here has been announced by G. V. Pollard, general works manager.

Erection of a new 180x320 ft. metal stamping plant is the main part of the construction program.

Additional presses, electric welding equipment, and other machinery will be installed.

Announcement was also made of the appointment of O. L. Currier, formerly of Detroit, as factory manager.

Birmingham Bureau Opposes Deferred Payment Plan

BIRMINGHAM, Ala.—The Birmingham Electric Refrigeration Bureau has passed resolutions discouraging the practice engaged in last year of offering deferred payments to customers purchasing electric refrigerators during the tail end of the season.

This action was taken on the complaints of some dealers that they had bad experience with this plan last year, as some customers made use of the refrigerators during the months of no payments and then turned them back in the spring, so they could purchase newer models.

The deferred plan was designed especially to appeal to purchasers during the Christmas shopping season. The argument was used that the purchaser could get Christmas bills out of the way before starting payments on the refrigerator and at the same time be able to enjoy the use of it.

Chiseling 'Mushroom' Outlets Rob Flint Dealers of Profits and Salesmen, News Reporter is Told

By Winifred Hughes

FLINT, Mich.—Refrigeration dealers here unanimously wring their hands and hold their heads at the mention of price cutting. For this phase of refrigerator merchandising is in its most acute stage in Flint.

"At least 15 new 'mushroom' dealers have opened up here during the last year. They are chiselers who are after the gravy and they figure that when the tough tide comes, they'll lock up their doors and move out," one dealer explained.

Price cutting is partly responsible also for a second refrigeration evil in this city—rapid manpower turnover. By selling boxes at considerable discounts, hiring large sales staffs, and paying them commissions over the normal rate paid by the ordinary dealer, several of the new "sunshine" or "mushroom" dealers have done much to complicate selling.

August with its factory shutdowns (Both Buick and Chevrolet factories are located in Flint) means a general tapering down of refrigeration business. Summer sales have been on the down-slant since May, which was the top sales month for dealers here.

Dealers with exclusive franchises represent Frigidaire, General Electric, and Westinghouse. There are four Kelvinator dealers, and the majority of retail merchants handle several makes.

"Business is lousy," was the frank way in which G. E. Spielmaker, head of the Flint Good Housekeeping Shop, expressed his feelings. He added that it was due to the "mushroom" dealers who suddenly opened shops throughout the city and started price cutting that his business has been bad.

"Even at that," Mr. Spielmaker said, "we've managed to sell about 200 boxes since the spring selling season opened." The seriousness of the problem can be best illustrated by Mr. Spielmaker's account of a sale to a personal friend of his.

"This man came in to see me and looked at one of our refrigerators which he wanted. While shopping around he went back to this one store several times. Each time he went back the dealer came down $10 more on the refrigerator, until he finally quoted $65, so the man closed the deal.

"We let the sale go when it comes to a question of cutting prices. It has meant a lot of lost business to us. I told the Kelvinator territory man who visited me last night that unless something is done soon about the situation, no one's going to make any real money in refrigeration.

"If the manufacturers would agree to sell only to those distributors who promise to maintain list prices on the boxes they handle, and strike off their lists those who failed to keep the agreement, the situation might be righted again," Mr. Spielmaker stated.

Mr. Spielmaker also connected price cutting with the manpower problem. "When salesmen find out that they can get more commission doing the same work for someone else, they naturally go after it, and then the dealers are faced with the problem of getting and training new men."

Operating as an independent company in no way connected with the chain of Good Housekeeping Shops spread out through Michigan, the Flint store has the following business policies: finances its own paper, makes no trade-in allowances on old ice boxes, and maintains its own service department.

"We have not taken in one trade-in deal this year," Mr. Spielman said. In his opinion, such deals lose money for the dealer.

With such policies, the store had a little less business than that of the preceding year, but the season has had its high spots. The 1936 volume would, according to Mr. Spielman, have come up to its preceding mark had not the Flint market been suddenly deluged with new dealers; some of whom gain their sales through lessening their profits.

The store has handled Kelvinator line for the past three years. It has in previous years carried other makes of refrigerators, but now is carrying but one. Handling one line only has

(Concluded on Page 4, Column 1)

Parts Makers To Convene in Memphis, Tenn.

Colyer and Gleason Will Arrange Program For Meeting

DETROIT—Annual meeting of the Refrigeration Supplies and Parts Manufacturers Association will be held Tuesday, Nov. 10, at the Peabody hotel in Memphis, Tenn., it was announced last week by Frank J. Gleason, executive secretary.

Mr. Gleason and J. D. Colyer of Wolverine Tube Co., president of the association, are to prepare the program for the meeting.

At its recent meeting in Detroit the board of directors of the association appointed the following the nominating committee, whose duty it shall be to submit at the annual meeting a slate of nominees for all offices which are to be filled during the ensuing year:

Thomas Coyle, E. I. du Pont de Nemours & Co., Inc.; J. L. Shrode, Alco Valve Co.; J. W. Hatch, Bush Mfg. Co.; W. A. Leonard, Imperial Brass Mfg. Co.; A. J. LaGess, Hinsdale Mfg. Co.

Also at the recent board of directors meeting the parts manufacturers were given an opinion on how best to adapt their operations to the Robinson-Patman anti-discrimination act by E. C. Lewis, corporation attorney of the firm of Lewis and Watkins.

Mr. Lewis suggested that if the manufacturer's cost system were not adequate to furnish accurate cost figures, that immediate steps be taken so that cost systems would reveal accurate costs which would substantiate the actual difference of manufacturers' costs for various quantity runs.

As generally interpreted, the act provides that quantity discounts are allowed only to the extent that they represent "differences in the cost of manufacturer, sale or delivery resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered," said Mr. Lewis.

Whether the discounts allowed comply with this, Mr. Lewis explained, is a question of cost accounting to be determined by accountants and not by lawyers. General or average figures will not do, he warned. He further stated that price differentials cannot be claimed on the basis of a difference in cost in the sellers' entire business. They must not exceed the savings which arise in the particular transactions in which the discounts are allowed.

Mr. Lewis advocated that manufacturers have a standard form of printed contract whereby all quantity discounts would be shown thereon, so that the small quantity buyer could see the discount of the large quantity buyer and vice versa. In other words, all customers buying from a particular manufacturer would have the same contract form and each buyer's price would be governed by the quantity he purchased.

As a further suggestion, Mr. Lewis advised that each manufacturer make known to his attorney the nature and facts pertaining to contracts with particular customers, and be governed by the attorney's decision with regard to each individual case.

Kelvinator Buys Interest In Washing Machine Co.

ALLIANCE, Ohio—Kelvinator Corp. has acquired half interest in the newly formed Appliance Mfg. Co. here. This concern, other half of which is owned by the Dexter Co., Fairfield, Iowa, will occupy the former plant of the Buckeye Jack Mfg. Co.

The new line of washing machines, bearing the Kelvinator nameplate, will be introduced at the company's dealer convention in January. Kelvinator's sales organization will handle distribution of this new product.

R. D. Hunt, former executive vice president of the Dexter Co., will head the new organization.

Value of the annual output of the new plant is estimated at $6,000,000, and more than 200 persons will be given employment when the plant opens this fall.

Kitchen Modernization Displays Attract Prospects at New York Exhibit

By Winifred B. Hughes

NEW YORK CITY—Kitchen modernization, with the planned kitchen display of Westinghouse Electric & Mfg. Co., and of Rex Cole, Inc., received a major portion of attention among the household appliance exhibits at the Electrical and Radio Exposition here.

Thousands of eager-to-question persons inspected both displays daily, and hundreds of good leads on kitchen prospects were obtained, according to W. T. Baker Jr., head of this activity for the Westinghouse New York office at the show, and J. S. Steele, salesman for Rex Cole, Inc.

Completely enclosed in blue and gold colored drapes, the Westinghouse exhibit had at its entrance a miniature kitchen setup, utilizing 6 in. high equipment. Effective in that it portrayed a Westinghouse kitchen completely equipped and built to scale, the kitchen had a green and cream color combination, and halted all visitors to Westinghouse products at the beginning.

Back wall of the Westinghouse display had a planned kitchen, equipment in which, said L. A. Wells, head of the display, was sold the first day to a New York dealer for use in his showroom.

"To give you an idea of the interest our kitchen has attracted," said Mr. Wells, "the 10,000 folders we had on the planned kitchen were exhausted within the first few days."

Interest this year has centered more upon ranges than on refrigerators, Mr. Wells stated.

This has been partly due, he claimed, to the publicity given ranges, and to the lower electric current rates now offered by Brooklyn Edison Co.

Next in the point of popular interest in the Westinghouse booth, Mr. Wells believed, was the "Food Crafter," a new appliance just introduced, and featured in *McCall's* Magazine. Shown at a circular counter in the center of the major appliance display, the Food Crafter is a built-in mechanical appliance with the motor in a compact housing. Attachments for it include juice extractor, food chopper, shredder and slicer, and others.

But to get back to the kitchens: "Perhaps the most gratifying interest among the many inquiries we've had has been that of builders and contractors," said W. T. Baker Jr.

While the display's principal purpose is to attract prospects for kitchen equipment from among Show visitors, the imminent concern according to this New York representative is to educate dealers—to sell them on the methods of making planned kitchen sales.

Specifications for remodeling or planning new kitchens, are done by the headquarters staff at Mansfield, Mr. Baker explained.

Three salesmen and three home economists were constantly in attendance at the Westinghouse exhibit. Importance of the home service representatives in promoting kitchen equipment sales was emphasized by Mr. Baker.

"One definite improvement they helped us to make is in our 1936 range," he said. "At the first kitchen clinic which we held at Mansfield two years ago, we had informal discussions on appliance sales points and their problems. They had one big complaint on the ranges:

"We had controls for low, high, and medium cooking speeds, but even the low was not of small enough volume so that a housewife could put foods to simmer on top of the range. Our 1936 ranges have been built to provide for this, with new controls."

The Westinghouse Mobilaire air-conditioning unit also was a stopping place for exhibition visitors throughout the 10-day show.

The G-E distributor's section at the Electrical Show was presented with characteristic Rex Cole showmanship. Waist-high bold relief letters spelled out the firm name at each door of the booth. An electric eye drinking water unit reminded weary showtrotters that they wanted a drink, and then drew them in to see the G-E "Thrift Kitchen," in one corner.

Built for the smaller house or apartment, the kitchen is completely assembled in two-ft.-wide units. It consists of a G-E refrigerator, range, dishwasher, sink unit, disposal unit, and cabinet shelves.

"We've practically filled the book (a large black ledger) with new prospect names," said J. S. Steele, salesman.

You see, the kitchen is designed not to fit any standard specifications. By having it in two-ft. sections, it can be fitted into even the most old-fashioned type kitchen.

Leads obtained at the show will be checked for accuracy and then distributed to the G-E retail representative in whose district each name comes, he explained.

Of the work Rex Cole, Inc., has done selling group equipment to builders, Mr. Steele told of a New York realtor who recently built nine suburban homes with G-E air-conditioning and heating equipment installed. The houses, completely equipped, could be purchased for just $900 over the moderate price of the homes.

So successful has the realtor been with selling his houses that he is now planning to build 25 more, completely equipped by G-E, to sell at between $15,000 and $20,000.

All the manufacturing or distributor representatives we contacted at the show agreed that people at this year's show are in a buying mood—and they are all very curious.

Plenty of worried frowns have been born on booth attendants' brows during the show. People insisted on taking things apart—and *"please don't touch"* signs only egged them on. Miss Thompson, home economist at the Rex Cole, Inc., display said:

"A hundred times today I've had to rush over to keep some woman's hand out of the ironer."

George D. Corcoran, head of the department store sales for the New York Frigidaire branch, also shared this difficulty.

The four microscopes showing the relative stages of bacterial growth on substances under un-refrigerated and refrigerated conditions, bore a huge sign: "Please don't adjust or move microscopes," but nobody seemed to read, Mr. Corcoran said.

One of the big attention-getters at the Frigidaire booth, the microscopes drew a standing-in-line group of New Yorkers—hundreds of them heard the Frigidaire proof story, (we did, even for the 100dth time) and became listed in the Frigidaire prospect book.

"It would be impossible to estimate the number of direct sales we shall make as a result of the Show, but it's always a big factor for us every year," Mr. Corcoran said.

Discussing some of his work in Frigidaire's department sales section, Mr. Corcoran mentioned that the chief difficulty is the same old one: department stores carry too many lines to get salesmen to push any one line. But at that Frigidaire comes out on top, Mr. Corcoran believes.

Adding that he read REFRIGERATION NEWS with avid interest, Mr. Corcoran said that he found the interviews with Long Island dealers in the Sept. 16, 1936, issue were of especial interest to him.

Cincinnati Survey Indicates Penetration of Class Markets By Various Brands of Electric Refrigerators

Brands	Class A No.	Class A % of Brand	Class A % of Class	Class B No.	Class B % of Brand	Class B % of Class	Class C No.	Class C % of Brand	Class C % of Class	Class D No.	Class D % of Brand	Class D % of Class	Total No.	Total %
Frigidaire	155	36.0	28.9	136	31.6	23.3	95	22.0	19.6	45	10.4	24.7	431	24.1
General Electric	105	32.7	19.6	109	34.0	18.7	81	25.2	16.7	26	8.1	14.3	321	18.0
Norge	68	23.1	12.7	90	30.6	15.4	105	35.7	21.7	31	10.6	17.0	294	16.5
Westinghouse	49	32.6	9.1	46	30.7	7.9	46	30.7	9.5	9	6.0	4.9	150	8.4
Kelvinator	33	27.0	6.1	44	36.1	7.5	29	23.8	6.0	16	13.1	8.8	122	6.8
Crosley	31	27.2	5.8	32	28.1	5.5	36	31.6	7.4	15	13.1	8.3	114	6.4
Grunow	15	20.9	2.8	23	31.9	3.9	23	31.9	4.8	11	15.3	6.0	72	4.0
Coldspot	Not Available by Class Groups												59	3.3
Electrolux	12	31.6	2.2	11	28.9	1.9	8	21.1	1.7	7	18.4	3.9	38	2.1
Copeland	10	33.3	1.9	10	33.3	1.7	8	26.7	1.7	2	6.7	1.1	30	1.7
Majestic	4	23.5	.7	7	41.2	1.2	4	23.5	.8	2	11.8	1.1	17	1.0
Apex	4	26.7	.7	9	60.0	1.5	2	13.3	.4	..	....	...	15	.8
Servel	Not Available by Class Groups												14	.8
Mohawk	Not Available by Class Groups												13	.7
All Others	Not Available by Class Groups												97	5.4

Price Range and Point of Purchase Also Covered in Study of Market

CINCINNATI—Relative penetration of market classes, price range on electric refrigerators, and point of purchase, are among the factors covered in a survey of buying habits among 4,740 housewives held by *Cincinnati Post*.

Parent-Teacher Associations were utilized in the collection of market information. The *Post* paid the Association fund a certain amount for each of the survey forms which were filled out completely and accurately. To insure accuracy, the questions were phrased and arranged so as to provide for double checking.

The total 4,740 questionnaires accepted provide a 2½% sample of the 180,000 families in the Greater Cincinnati area, the *Post* claims. Questionnaires were so distributed that an even cross section of an entire city zone was obtained, it is stated.

To afford an opportunity for detailed study of the buying habits of all types of people, the reports were classified in four groups: Class "A" comprises a group in which most homes are valued at $9,000 and over; Class "B" is a group with most homes in the $6,000 to $8,999; Class "C" of homes in the $4,000 to $5,999 class; and Class "D"—most homes less than $4,000.

Concerning refrigerators the housewife was asked: "What make of refrigerator did you buy?" "How much did you pay for it?" and "Where did you buy it?"

The survey shows Frigidaire to be the leader in the total number installed. Being the make reported owned by 24.1% of those reporting; General Electric was second with 18%; Norge third with 16.5%; Westinghouse next with 8.4%; then Kelvinator with 6.8%; closely followed by Crosley with 6.4%. (For a tabulation of the returns on make of refrigerator owned see Table 1).

This tabulation is not, of course, a guide as to the ranking of the various makes in terms of current sales, as the different makes have been sold in Cincinnati for varying lengths of time.

There was very little variation in brand ownership by classes; among the leaders the extent of the variation was hardly ever more than 5%.

Demonstrated by the survey was the fact that over 60% of those owning electric refrigerators had purchased their unit at a cost of $200 or more. Following is the breakdown of price classifications in percentage of those reporting:

$400 and over	4.6%
$300 to $399.99	13.1%
$250 to $299.99	20.8%
$200 to $249.99	23.6%
$160 to $199.99	15.7%
$125 to $159.99	12.5%
$80 to $124.99	7.8%
Under $80	1.9%

In the "Class A" or wealthiest group the division by price class is:

$400 and over	8.0%
$300 to $399.99	17.7%
$250 to $299.99	20.4%
$200 to $249.99	19.2%
$160 to $199.99	13.6%
$125 to $159.99	10.7%
$80 to $124.99	8.5%
Under $80	1.9%

In "Class D" or the group with the lowest income the division by price classification is as follows:

$400 and over	3.9%
$300 to $399.99	12.3%
$250 to $299.99	19.9%
$200 to $249.99	19.9%
$160 to $199.99	16.8%
$125 to $159.99	12.3%
$80 to $124.99	11.0%
Under $80	1.7%

The independent electrical appliance dealer far outshadowed any other type of outlet in selling refrigerators to the Cincinnati homes reporting in the survey. Department stores accounted for about 20% of the total volume, and the utility company's Gas & Electric Shop for 9.3%. Here's how the sales to 4,740 homes were divided up by point of purchases:

Department Stores	
Fair	4%
Shillito	3.6%
McAlpin	2.1%
Pogue's	1.6%
Rollman	1.6%
Mabley's	1.7%
Alms & Doepke	1.1%
Others	5.2%
Furniture Stores	
May Stern	2.1%
Solway	1.2%
Others	6.5%
Other Outlets	
Gas and Electric Shop	9.3%
Appliance Stores	28.5%
Radio Stores	3.3%
Other Stores	24.5%

Service Convention Exhibits Listed

(*Concluded from Page 1, Column 2*)

held Thursday night. On Friday night the Exhibitors Frolic will be held from 8 to 11 p.m., after which the delegates will visit the Beale Street Palace.

Arrangements of the activities in Memphis are in charge of George Uetz, president of the Memphis chapter of the Society; and W. H. Moss, Memphis, second vice president of the national society.

Exhibitors will include:

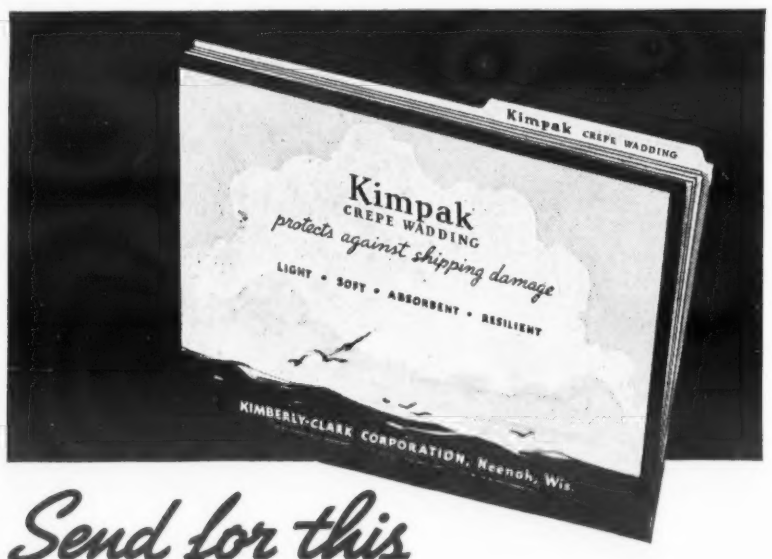
Airo Supply Co.; Alco Valve Co.; Harry Alter Co.; American Injector Co.; Ansul Chemical Co.; Automatic Products Co.; Copeland Refrigeration Corp.; Curtis Refrigerating Machine Co.; Cutler-Hammer, Inc.

Detroit Lubricator Co.; Dole Refrigerating Co.; Fedders Mfg. Co.; Frigidaire Corp.; Fulton Sylphon Co.; General Electric Co; L. H. Gilmer Co.; Henry Valve Co.; Imperial Brass Mfg. Co.

Kellogg Compressor & Mfg. Co.; Kerotest Mfg. Co.; Mills Novelty Co.; Mueller Brass Co.; Peerless Ice Machine Co.; Penn Electric Switch Co.; Perfection Refrigeration Parts Co.

Ranco, Inc.; R. & H. Chemicals Dept; Rotary Seal Co.; Skinner Chuck Co.; Snap-On Tools, Inc.; Standard Refrigeration Parts Co.; The Starr Co.

Tecumseh Products Co.; Virginia Smelting Co.; Wolverine Tube Co.; Zenith Carburetor Co.



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The new LOXIT type Ace Hard Rubber Doors are attracting wide attention due to their new and valuable improvements in construction and design. ● It will pay you to investigate LOXIT *at once* as the new doors are now available at no extra cost. Write to

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Florida Utility Aid Helps To Uncover 2,500 Prospects

MIAMI — During the three-month period ended Sept. 8, Florida Power & Light Co. cooperated with electrical appliance dealers in its territory in sponsoring an extensive "Go Modern" campaign which uncovered 2,500 refrigerator prospects, more than half of which developed into actual sales.

Object of the campaign was to make the kitchen "the most modern spot in the home." Electric refrigerators, ranges, water heaters, dish washers, and air-conditioning units were the leading appliances promoted.

Cooperative advertising was one of the major factors contributing to the campaign's success. Local dealers tied in their own advertising with that of the utility in newspaper spreads, billboard displays, and radio broadcasts over three stations.

The entire territory was canvassed at least twice.

Architects and builders cooperated by placing complete electrical displays in new houses.

On the floor of the utility office various appliance dealers rotated displays of their refrigerators.

Result: throughout the territory served by Florida Power approximately 9,000 electrical appliances were sold, of which 6,309 were electric refrigerators.

The campaign closed Sept. 8, but the aftermath is still going strong. On Sept. 10 one retailer reported an $11,500 volume in 24 hours. Sears Roebuck reported a $12,000 electric refrigeration day.

Survey in New Jersey Shows Increased Use Of Refrigeration

NEWARK—A marked increase in the use of electric refrigeration in New Jersey homes was revealed in a survey recently conducted by Public Service Electric & Gas Co. The utility reports that one of every three of its 750,000 domestic customers now has an electric refrigerator, whereas five years ago only one in seven had electric refrigeration.

Fifty Public Service Co. electric refrigeration salesmen on Sept. 16 began a 10-day trip to Havana, their reward for excellence during a five-month sales campaign sponsored by Kelvinator Corp. Prior to sailing, the men were given a dinner at the Robert Treat hotel here, at which Kelvinator and Public Service Co. executives spoke.

New Fall Promotion on Ranges Sent Out by G-E

CLEVELAND—A new merchandising outfit to boost General Electric range sales has been devised by J. R. Poteat, range sales manager.

It is known as the "G-E Ranger," and was devised especially for the fall range sales activity. Covering a five weeks' sales campaign, it combines timed prospect mailings with timed personal contacts, and outlines the range salesman's work for each day during the drive. A daily card index in the "Ranger" automatically directs the salesman's work. Each outfit includes 50 sets, or pieces, of mail literature, imprinted with the salesman's or dealer's name.

Johnson Distributing Co. Signs Up 24 Dealers

TAMPA, Fla.—Twenty-four dealers in practically that number of working days is the first month's record of the Johnson Distributing Co., new Crosley distributor, Tampa, Fla.

"Florida has come back," J. E. Johnson, head of the firm declares. "The outlook on the Florida West Coast is brighter than it has been in years, and with some hard work Crosley products should show a marked increase in this territory, beginning immediately."

Sparton Radio Distributor Holds 5 Dealer Meetings

ATLANTA, Ga.—Lamar-Rankin Co., Sparton radio distributor here, recently conducted a series of two-day dealer meetings in five cities in the organization's trade territory.

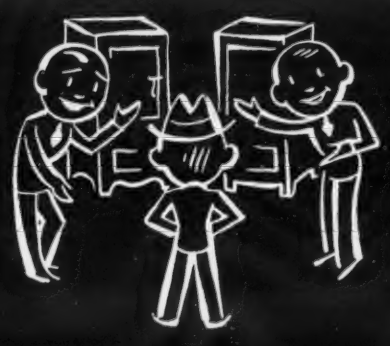
C. P. Humphries, manager of the Lamar-Rankin appliance department, conducted the meetings, at which the complete 1937 Sparton line of radios was exhibited. Hugh Snyder, district sales manager, assisted.

Meetings were held in Macon, Columbus, Savannah, and Augusta, Ga., and Anderson, S. C.

Not many men will understand this ad

From the time in earliest history when there came to be more than one person selling the same thing, we have had what we choose to call the evil of price cutting. Price cutting is only one form of competition, and competition, the copy-books tell us, is the life of trade.

Competition that helps to establish prices on an economically sound basis is a good thing. You remember when a certain safety razor used to sell for $5.00 which can now be purchased in the 5 and 10 cent store. As a piece of processed metal it wasn't worth $5.00. But as a patented article, it had no competition. When competition arrived, a sensible price was established which still nets the maker a profit.



But price *cutting* that fails to allow for proper costs and a reasonable profit does nobody any good. When one dealer cuts his price below a *reasonable* figure to steal business from a competitor, he merely invites the other dealer to meet his price or beat it. Then there is no bottom. If *both* dealers maintained the established price and sold on the basis of value and service, their competitive position would be just the same as though they both cut the price.

Not many men will understand this. It is too simple. But those who do will understand also the advantage of selling *value* rather than *price*. And the dealer who is fortunate enough to be handling a refrigerator with Dry-Zero Insulation will be able to use this as a selling point to completely offset the cut price argument of a competitor whose refrigerator does not have Dry-Zero Insulation.

Dry-Zero Insulation in a refrigerator will save 20c to $2.00 per month in cost of operation for the whole life of the refrigerator. This is because Dry-Zero Insulation is the most efficient available and maintains this efficiency indefinitely. It is unique in this respect because unaffected by the moisture that inevitably penetrates into the wall of any refrigerator in use.

If you do not have this complete story, write for copies of the interesting folder, "How Dry-Zero Insulation in your refrigerator saves you money every month in cost of operation."

Dry-Zero Corporation, 222 North Bank Drive, Chicago, or 687 Broadview Ave., Toronto, Ontario.

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INSULATION
The Most Efficient Commercial Insulant Known

Flint Refrigerator Dealers Attack Outlets Which Specialize in Price Cutting

(*Concluded from Page 1, Column 4*)

a certain disadvantage, the dealer said, in that in selling to a price conscious prospect there is no alternative brand upon which to switch his attention when the model he wishes does not coincide with what he plans to pay for the refrigerator.

A series of 30 spot radio broadcasts has been one of the chief promoting plans used by the Flint Good Housekeeping Shop this year. This has been supplemented with newspaper advertising.

Five men are employed in the shops service department. They service not only Kelvinators sold by the company, but also most of the Copeland refrigerators and other mechanical refrigerating units in use in Flint.

* * *

One Dealer Uses Half of The Town for Salesmen

Month of May brought to the Appliance Exchange, dealer handling Norge and Crosley here, an avalanche of sales that reminded Lloyd Nichols, part owner of the store, of nothing so much as a bargain day sale.

"The women rushed in here and bought; sometimes there would be three at once, all asking questions about one of our refrigerators. I sold 11 in one day, myself," said Mr. Nichols.

Doing most of its business in range sales, and with radios as next highest appliance sellers, the store has handled refrigeration for several years, but it has been only this year that refrigeration has become an important profit item.

"We've sold approximately 175 boxes since April," Mr. Nichols stated.

Located on the outskirts of Flint, the Appliance Exchange Market occupies one half of a small store building. It is stocked with an array of Norge refrigerators, Crosleys, electric ranges and radios.

The greatest problem which Flint dealers now face, in Mr. Nichols opinion, is meeting the competitive practices of one of the new dealers who makes salesmen of half of the people in the town by personally contacting them and offering exorbitant commissions for prospect tips on which sales are closed, and allowing them to bring down the price of the refrigerator until only a bare $5 profit is left.

"If he would stick to hiring straight specialty salesmen, we could do business in competition with him. But that isn't his way," Mr. Nichols commented. "And when he makes salesmen of virtually half the people in the town, it's hard to sell against him.

The casually appointed "salesmen," hearing of one of their friends or acquaintances who is in the market for an electric refrigerator, will say: "Why I can get you that refrigerator for $20 less," get the sale, and then collect 20 to 30% commission," he explained.

Salesmen working for this dealer are told to go ahead and get the sale, even if the profit, over and above the commission which they will collect, amounts to only $5 per box, Mr. Nichols stated.

While this wholesale salesman-using plan is frowned upon by the Appliance Exchange, the firm does do a great deal of business through its "user" affiliations.

"One of our men recently sold 17 refrigerators as a result of his initial sale," he remarked.

Especially with its range customers does the Appliance Exchange Market get new leads. The Norge user plan, which gives $5 for a prospect tip that brings in a sale, and one used by the dealership before this was effective, have helped established this practice.

"We try to make friends of our range purchasers. Either my partner or I go out to the customer's home when a range is installed, and we see that any servicing required is given promptly," said Mr. Nichols. "From this we get tips on other people who want appliances."

* * *

Westinghouse Dealer Hires Men for Long Service

C. E. Brown, manager of refrigeration activities for the George W. Hubbard Hardware company, Westinghouse dealer here, says that his department does not have a salesman turnover problem because he chooses his men carefully, with an eye to their probabilities.

"I want men who will stay with me eight or 10 years, men who are capable of earning at least $50 a week."

Once they are hired, the men are put through a training course, and taken under the manager's "wing" during their early sales activities. They are paid on straight commission basis.

Weekly sales meetings do much toward keeping the men pepped up, Mr. Brown commented. The store has six salesmen working in its appliance department at the present time. They alternate their time so that part is spent on floor duty, and part following up outside contacts.

Most of the sales made by the Hardware company's refrigeration department are to the store's customers, or through user leads. Merchandise prizes are given for tips resulting in sales, the manager stated.

While the deplorable state of price cutting in Flint is very well known to Mr. Brown, evidently he isn't worrying overmuch about it.

"There is always a horde of sunshine dealers who pop up when business is at its peak, and sell their boxes cheap and fast, knowing that when things slacken up and overhead confronts them, they'll close their doors and move on," he commented.

Stating that he reads AIR CONDITIONING AND REFRIGERATION NEWS from cover to cover each week, Mr. Brown picked up the survey in the issue of Aug. 26, 1936, made by General Electric as to the relative value of factors resulting in sales.

"I've been keeping track of the sales our men have made, for my own information during the past few years, and I find that my analysis is quite similar to this survey," Mr. Brown said. Such information, gleaned by the manager, is then relayed to the company salesmen to prove selling points, he added.

While the FHA was responsible for a large number of sales made by this dealer during the last year, there was no noticeable decline in its sales when it was no longer in effect, the manager stated. Sales on its electric refrigerators, Mr. Brown said, have gone up approximately 15% over those for the 1935 selling season. May and July were the best sales months, and since factory shutdowns have crimped incomes of many of the people in this city, sales have been on the seasonal decline during August, the manager said.

The Hubbard hardware company is the exclusive Westinghouse dealer in Genessee County; it has however, one sub-dealer who sells approximately 10 or 12 refrigerators a year, Mr. Brown estimated.

Advertising in the local newspaper, and using direct mail pieces prepared by the Westinghouse promotion department also help to sell refrigerators for Hubbards.

But the store has an ultra conservative policy, and sponsors no contests or special promotions to boost its sales. Mr. Brown, however, is strongly in favor of inter-organization contests, and plans to do more with this type of promotion during the coming year.

Right now the salesmen are endeavoring to tie-in with the Westinghouse Lucky Nickel promotion now in effect. The company isn't running any special refrigeration promotions, but will probably have a fall campaign of some kind, Mr. Brown believed.

For its range promotions, the Hubbard hardware frequently holds cookery demonstrations, run by home economists of the local power company. Then once a year the store has a Westinghouse demonstration, in which a Westinghouse home economist conducts a cooking demonstration in the store's refrigeration section.

The best argument which its salesmen have for meeting price cutting tactics, the manager explained, is to tell the customer that: "You can't afford to consider saving $10 when you are making a $200 purchase.

* * *

Power Co. Sells 360 Units In Two Months

Although there has been a gradual shift in the market for electric refrigeration sales, Consumers Power Co. exclusive Frigidaire dealer here, has raised its seasonly volume considerably this year, according to M. D. Rodgers, veteran salesman.

Where the company sold approximately 60 refrigerators in June, 1935, their sales for this year were 160, followed by 200 unit sales in July of this year.

"Most of our sales were to people in the higher salaried class, but now saturation is pretty high in that group, and we are selling to those in the lower income groups.

Twelve salesmen who work with open territories are employed by the power company. Where some of the men switch from selling refrigerators to more seasonable items through the year, Mr. Rodgers believes that it's a better idea to stick to refrigeration the year round.

Little is done by the power company the way of special promotion on its refrigeration line. During the summer months, it runs advertisements, approximately 8 or 10 inches insertions, in local papers, on an average of once every two weeks.

While sales are slack right now, the summer has been a good season, the salesman stated. On one particular day, he recalled, 90 refrigerators were delivered to customers homes.

Maintaining a large home service group, the power company has most of the home economists' work directed towards range selling, or to follow up work on range sales. Two of the group were present on the main floor of the utility show room, the day of the interview, giving cookery demonstrations on how to can fruits and jellies.

Many of the new prospects' names taken in by Consumers are derived from service department calls.

"We used to receive so many calls from people, and we'd send out the men and find that the refrigerator needing servicing might be any kind. So we've made a careful survey of the city, and we have tabulated the kinds of refrigerators in use. When we get a call now, we send men out to work only on Frigidaires, on refrigerators of the make we sell."

* * *

Department Store Moves Appliances to Annex

Because its refrigeration activities have spread so continuously, and its department in the Smith Bridgman Co., department store here, was no longer large enough, the entire appliance section of this Flint department store was moved recently to a separate annex across the street from the department store.

Handling its own finance paper, the store was affected little by the cessation of FHA loans for household electric appliances.

N. McIntyre, manager of refrigeration, claims that business has increased considerably, even though the move came right in the midst of the summer selling season. The store is G-E dealer for the city of Flint, and handles no other line at the present time.

Contents of the New 512-Page Book of Specifications

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Markup Determining Factor as 11 Out of 28 Refrigerator Dealers Report Profit In Dun & Bradstreet Survey

NEW YORK CITY—Of the 28 retailers of electric refrigerators and refrigerating apparatus reporting for the annual survey of operating averages made by the statistical division of Dun & Bradstreet, only 11 showed a profit.

As shown in Table 1, the difference between the profitable concerns and the average of all those reporting seemed to be in the markup. For profitable concerns the average markup was 72.1%; for all concerns reporting, the average was 57.3%.

The survey covered operations in the year 1935. Average gain in sales in 1935 over 1934 was 13.2%, the survey revealed.

All of the concerns reporting declared that they sell on the instalment plan. Average amount of business done on the instalment plan was 45% of the total.

Because of the small number of dealers reporting no breakdown by population or sales groups was made for refrigerator dealers, as was done for many other groups. Those in charge of the survey entered a plea that more dealers report on their operating averages so that a better picture of average conditions might be obtained.

Somewhat different results were shown in a survey of electric and gas household appliance stores. (See Tables 2, 3, and 4.)

Two hundred and eight or 66.8% of 311 stores covered, reported profitable operations for the year. Average sales increase over 1934 was 21.1%.

Inventory turnover of these stores, as usual, increased in direct proportion to the population which they served and the amount of business which they transacted annually.

Average total overhead of all stores reporting was 32.9%, while the average gross margin (% of sales) was 37.0%, and average markup (% of cost) was 58.8%.

Although a preponderance of open credit stores was reported (228 as against 13 cash stores), only 78.0% of these stores operated at a profit last year, while 84.6% of cash stores were out of the red.

Table 1—Summary of Typical Experiences For 1935 of 28 Refrigerator and Refrigerating Apparatus Concerns

			All Concerns Reporting	Profitable Concerns
1	(a)	Number of Concerns Reporting	28	11
	(b)	Aggregate Net Sales	$ 1,007,200	$ 350,800
	(c)	Typical Net Sales	$15,600	$15,600
		Profit and Loss Statement (in percentages of Net Sales):		
2		Cost of Goods Sold	63.6%	57.8%
3	(a)	Overhead Expense: Total	35.0%	34.3%
	(b)	Salaries of Owners and Officers	8.8%	9.4%
	(c)	Salaries and Wages of Employes	9.8%	8.7%
	(d)	Rent (93% of concerns reported rent)	2.1%	1.6%
	(e)	Advertising	1.2%	1.3%
	(f)	Light and Heat	0.6%	0.8%
	(g)	Taxes	0.6%	0.5%
	(h)	All Other Expense	11.9%	12.0%
4		Profit (or Loss)	1.4%	7.9%
		Merchandise Ratio:		
5	(a)	Gross Margin (Percent of Net Sales)	36.4%	42.2%
		Usual Range of Experience (b) Upper Limit	62.4%	62.4%
		Usual Range of Experience (c) Lower Limit	26.7%	35.3%
6		Realized Mark-up (Percent of Cost)	57.3%	73.1%
7	(a)	Inventory Turnover (Times per Year)	4.0	3.7
		Usual Range of Experience (b) Upper Limit	6.5	10.0
		Usual Range of Experience (c) Lower Limit	2.2	2.9
8		Ratio—Net Sales to Closing Inventory	7.2	10.3
		Other Information:		
9		Typical Percent Change:		
	(a)	in Sales 1934-1935 (+ or —)	+13.2%	+13.2%
	(b)	in Inventory during 1935 (+ or —)	+25.0%	+45.0%
10		Credit Policies:		
	(a)	Number of "Cash" Concerns (over 90% Cash)	1	0
	(b)	Number of Concerns Selling on Open Credit	20	9
	(c)	Their Typical Proportion of Credit Sales	25%	40%
	(d)	Number of Concerns Selling on Instalment	21	7
	(e)	Their Typical Proportion of Instalment Sales	45%	50%

*Cities of more than 100,000 population account for 11 of the reporting concerns. Cities of 20,000 to 100,000 population account for 12.

Table 2—311 Electric and Gas Household Appliance Stores Report Operating Data for 1935

Table 1—Summary of Typical Experience for 1935

			All Concerns Reporting	Profitable Concerns
1	(a)	Number of Concerns Reporting	311	208
	(b)	Aggregate Net Sales	$11,408,300	$8,214,100
	(c)	Typical Net Sales	$19,900	$20,300
		Profit and Loss Statement (in percentages of Net Sales):		
2		Cost of Goods Sold	63.0%	61.0%
3	(a)	Overhead Expense: Total	32.9%	31.8%
	(b)	Salaries of Owners and Officers	10.1%	9.3%
	(c)	Salaries and Wages of Employes	9.6%	9.5%
	(d)	Rent (85% of concerns reported rent)	2.4%	2.3%
	(e)	Advertising	1.5%	1.5%
	(f)	Light and Heat	0.9%	0.8%
	(g)	Taxes	0.5%	0.5%
	(h)	All Other Expense	7.9%	7.9%
4		Profit (or Loss)	4.1%	7.2%
		Merchandise Ratio:		
5	(a)	Gross Margin (Percent of Net Sales)	37.0%	39.0%
		Usual Range of Experience (b) Upper Limit	44.0%	45.3%
		Usual Range of Experience (c) Lower Limit	31.1%	34.0%
6		Realized Mark-up (Percent of Cost)	58.8%	64.0%
7	(a)	Inventory Turnover (Times per Year)	4.7	5.1
		Usual Range of Experience (b) Upper Limit	7.6	8.2
		Usual Range of Experience (c) Lower Limit	3.2	3.3
8		Ratio—Net Sales to Closing Inventory	7.4	7.5
		Other Information:		
9		Typical Percent Change:		
	(a)	in Sales 1934-1935 (+ or —)	+21.1%	+30.9%
	(b)	in Inventory during 1935 (+ or —)	+25.0%	+28.0%
10		Credit Policies:		
	(a)	Number of "Cash" Concerns (over 90% Cash)	13	11
	(b)	Number of Concerns Selling on Open Credit	228	178
	(c)	Their Typical Proportion of Credit Sales	20%	20%
	(d)	Number of Concerns Selling on Instalment	248	171
	(e)	Their Typical Proportion of Instalment Sales	50%	50%

Table 3—Typical Operating Ratios of 311 Electric and Gas Household Appliance Stores Analyzed by Size of Concern and of Town in 1935

	Size of Concern (1935 Sales in Thousands of Dollars)	Under 10	10 to 20			20 to 30		30 to 50			50 to 100	
	Size of Town (1930 Census in Thousands)	All	Under 20	20 to 100	100 & Over	Under 20	20 to 100	Under 20	20 to 100	100 & Over	Under 20	20 to 100
1	Number of Concerns Reporting	68	59	11	19	21	12	30	16	22	13	13
	Profit and Loss Statement (in Percentages of Net Sales):											
2	Cost of Goods Sold	58.4	63.5	59.0	52.9	64.7	61.4	66.7	64.3	63.0	61.3	63.9
3	(a) Overhead Expense: Total	31.0	31.7	34.9	41.1	31.0	33.3	29.7	31.2	33.0	34.7	32.4
	(b) Salaries, Owners and Officers	14.9	12.6	10.0	12.4	9.6	9.6	8.7	11.0	8.7	5.0	4.8
	(c) Salaries, Wages of Employes	7.6	7.5	9.1	9.0	11.8	8.5	9.9	10.5	8.4	14.1	12.9
	(d) Rent	4.2	2.4	2.3	4.0	2.2	2.2	1.6	2.2	3.1	1.7	1.8
	(e) Advertising	1.4	1.4	2.7	1.8	1.0	1.2	1.1	1.8	2.2	1.4	2.5
	(f) Light and Heat	1.7	1.0	0.7	0.9	0.6	1.0	0.7	0.6	0.8	0.9	0.6
	(g) Taxes	0.5	0.6	0.3	0.7	0.6	0.3	0.3	0.5	0.6	0.6	0.7
	(h) All Other Expense	0.7	6.2	9.8	12.3	5.2	10.5	7.4	4.6	9.2	11.0	9.1
4	Profit (or Loss)	10.6	4.8	6.1	6.0	4.3	5.3	3.6	4.5	4.0	4.0	3.7
	Merchandise Ratios:											
5	Gross Margin (% of Net Sales)	41.6	36.5	41.0	47.1	35.3	38.6	33.3	35.7	37.0	38.7	36.1
6	Realized Mark-up (% of Cost)	71.3	57.6	69.6	89.2	54.6	62.9	50.0	55.6	58.8	63.2	56.6
7	Inventory Turnover (Times per Year)	2.8	4.7	4.0	3.9	5.5	5.5	5.3	5.3	5.6	5.7	9.1
8	Ratio—Net Sales to Closing Inventory	4.7	6.5	7.5	7.2	8.2	7.6	7.8	7.8	9.8	7.3	13.7
	Other Information:											
9	Typical % Change in Sales 1934-35	+25.0	+29.2	+19.2	+67.3	+29.0	+37.7	+24.8	+17.8	+16.4	+19.4	+36.8

Table 4—Analysis of Typical Operating Ratios of Profitable Electric and Gas Household Appliance Stores by Size of Concern and of Town in 1935

	Size of Concern (1935 Sales in Thousands of Dollars)	Under 10	10 to 20			20 to 30		30 to 50			50 to 100	
	Size of Town (1930 Census in Thousands)	All	Under 20	20 to 100	100 & Over	Under 20	20 to 100	Under 20	20 to 100	100 & Over	Under 20	20 to 100
1	Number of Concerns Reporting	39	43	7	12	14	7	21	12	12	11	9
	Profit and Loss Statement (in Percentages of Net Sales):											
2	Cost of Goods Sold	55.5	60.7	55.4	50.2	63.9	61.4	65.3	62.9	62.0	60.4	63.4
3	(a) Overhead Expense: Total	29.8	32.3	32.9	36.0	29.6	33.1	29.6	31.2	29.7	34.8	31.4
	(b) Salaries, Owners and Officers	15.1	12.6	...	11.2	9.6	...	8.7	8.3	8.7	4.8	4.8
	(c) Salaries, Wages of Employes	7.3	7.5	...	9.0	8.8	...	9.9	11.7	8.4	15.6	13.3
	(d) Rent	3.5	2.1	...	3.7	1.8	...	1.7	2.0	2.8	1.7	1.8
	(e) Advertising	1.4	1.4	...	1.8	1.0	...	1.0	1.4	2.3	1.3	2.5
	(f) Light and Heat	1.2	0.8	...	0.9	0.6	...	0.7	0.6	0.7	1.0	0.9
	(g) Taxes	0.5	0.4	...	0.2	0.6	...	0.3	0.7	0.6	0.7	0.3
	(h) All Other Expense	0.8	7.5	...	9.2	7.2	...	7.3	6.5	6.2	9.7	7.8
4	Profit (or Loss)	14.7	7.0	11.7	13.8	6.5	5.5	5.1	5.9	8.3	4.8	5.2
	Merchandise Ratios:											
5	Gross Margin (% of Net Sales)	44.5	39.3	44.6	49.8	36.1	38.6	34.7	37.1	38.0	39.6	36.6
6	Realized Mark-up (% of Cost)	80.3	64.8	80.5	99.4	56.6	62.9	53.2	59.1	61.4	65.7	57.8
7	Inventory Turnover (Times per Year)	2.6	5.5	2.7	3.9	5.5	5.5	5.4	5.3	5.6	5.7	8.2
8	Ratio—Net Sales to Closing Inventory	4.3	7.7	7.2	7.2	8.2	7.6	7.6	7.8	8.8	7.4	11.4
	Other Information:											
9	Typical % Change in Sales 1934-35	+40.4	+34.0	+35.5	+67.3	+27.4	+42.1	+23.4	+21.6	+27.8	+23.0	+32.6

Corliss Studies Foreign Commercial Markets

CLEVELAND—A five-months survey of commercial refrigeration needs abroad is being made by Frank M. Corliss of General Electric's commercial refrigeration department.

Mr. Corliss is now en route to South Africa, after having spent 23 days studying export markets in England and France.

During the trip Mr. Corliss will make his headquarters with the General Electric representative in each city he visits. In London John J. West, managing director of International Refrigerator Co., Ltd., was his host. In Paris he was entertained by H. A. Granary, of Frigeco, S. A.

On arrival in Johannesburg Oct. 12 Mr. Corliss will make his headquarters at South African General Electric Co., Ltd., of which S. Bloem is managing director. According to present plans Mr. Corliss will leave Johannesburg for Buenos Aires, Argentina, on Nov. 17, arriving Dec. 4.

C. C. Batchelder, manager of General Electric S. A., will be his host for a month in Buenos Aires. En route home from that city, which Mr. Corliss plans to leave about Jan. 4, 1937, he will stop over at Rio de Janeiro, Brazil, for about three days, visiting Earl Givens, managing director of Lojas General Electric, S. A.

Hackerman Made Buyer For Baltimore Store

BALTIMORE — Irvin Hackerman, formerly assistant manager of the refrigeration, appliance, and radio department of The Hub department store, has been appointed manager and buyer for those departments of Brager-Eisenberg, Inc., department store here.

Portland Furrier Buys New Servel System

PORTLAND, Me.—Servel refrigeration equipment has been installed to replace an older, inadequate system in the fur storage vault of the Schlosberg Co., furriers here, by George B. Williams Co., Servel distributor.

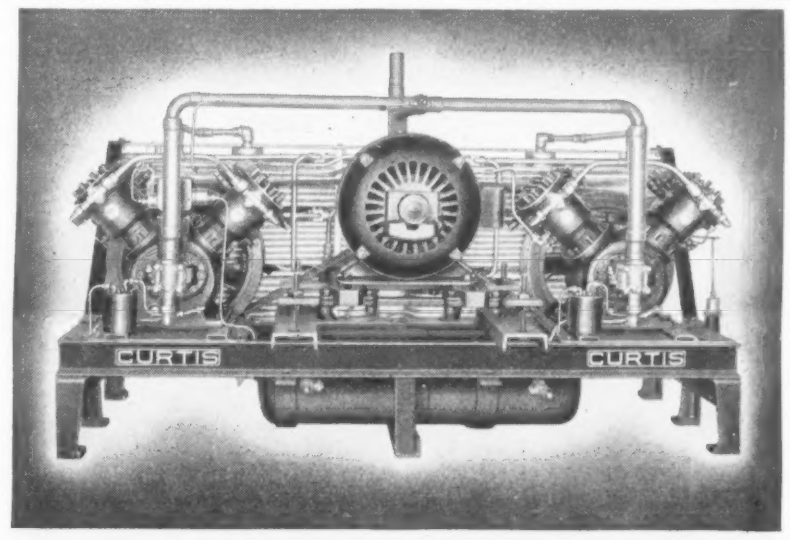
The storage space is 55 by 17 by 10 ft., and is insulated with 4-in corkboard. Temperatures maintained range from 30 to 38° F. Equipment installed includes one model WO-300 3-hp. machine and three HC-99B humidrafts.

Sadler Joins Anchor Lite

PITTSBURGH—Anchor Lite Appliance Co., distributor of Crosley refrigerators and other appliances last week announced the appointment of Harry M. Sadler as general manager.

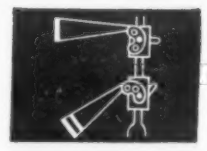
Tapered Roller TIMKEN BEARING EQUIPPED

CURTIS SCORES AGAIN

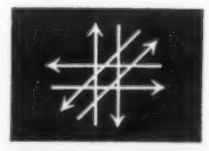


CURTIS pioneered the "V"-type Timken-roller-bearing equipped, pressure-lubricated refrigeration compressor which, at the time, was an innovation—now a generally adopted design.

Now CURTIS pioneers with a compact 30 Ton Dual Unit incorporating two proven "V"-type compressors driven by one motor.



Dual design permits automatic capacity control for variable air-conditioning loads.



Belt adjustment provided in all directions instead of usual vertical only.

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Around the World

With George F. Taubeneck

Next week: Paris! Readers of the NEWS will be taken on a personally-conducted tour next week of the capital of France, the city which seems to fire the imagination of Americans beyond all other metropolitan centers in the world.

Paris is also the headquarters of many European distributing organizations for American refrigeration and air-conditioning products, and France is consistently one of the leading importers of such equipment. Editor Taubeneck's survey of the refrigeration situation in France will be extensive, and will probably run for two or three issues.

In this, the 39th consecutive instalment of the editor's "Around the World" travelog, written during and after a seven month's journey through foreign lands, readers may visit Malta, a market as yet unscratched by refrigeration merchandisers.

Days and Knights

"Now," you say to yourself as you swing into the medieval harbor of Malta, "I'm seeing something. Now I know why I left home to see the world."

And the further you get into Malta, the more you explore its time-encrusted crannies, the better you get to know the people, and the longer you delve into its history, the greater becomes your conviction that this is one place which makes the traveler feel as if he were traveling.

Even the comfortable tourists who make a round-the-world cruise in one ship, interrupting their endless bridge games long enough to take an occasional whirl through the cabarets of a port on shore leave, cannot help but see something different when they set foot on the historic isle of Malta.

Did I say history? Mister, the history of Malta goes back to a period 40,000 years B. C., when the Neanderthal man wooed early Maltese females with a spiny club. It goes back even beyond the Phoenicians, for any tourist may see some of the mysterious wheel-tracks, cut inches deep into the stone of the island, which undercut Phoenician tombs.

The Greeks had no word for it, but they admired living there, as did the Carthaginians, who fought for it, and Romans, and the Turks. Knighthood and the Crusades—when Romance was in flower—have made of Malta a shrine long to be hallowed.

Up until Mussolini and his fast airplanes, Malta was another Gibraltar, behind which the British lion could quell upstarts with a mere growl. And believe me, ladies and gentlemen, Malta looks as impregnable as any stronghold on earth. (When destruction can swoop down from the sky, practically nothing *on* earth is impregnable).

Towering high and sheery above the water are the smooth walls of the fortified harbor. Enemy ships entering this harbor would have to run the gauntlet through withering fire from three sides. Even if they should survive such a storm, landing parties would be unable to ascend the steep, precipitous sides to get at the city proper.

Malta is a natural citadel which has been armor-plated with masonry down through the ages.

Perhaps that's one reason why the people remain in the late Middle Ages from the standpoints of culture and manners—modernity has not been able to climb the walls.

In dress and habit, in labor and leisure, the Maltese are a people apart. True, you see pert young women who buy Max Factor's make-up, Gotham Gold Stripe silk hosiery, and Manhattan copies of Parisian hats. True, the British military and naval aristocracy maintains the traditional whiskey-and-soda, boiled-shirt-and-point-to-point social rigamorale of the British empire.

But disregard the tea drinking and the lassies who have been to the movies. Concentrate on the oldsters, on the priests and dedicatees of holy orders, of the women in black cloaks and spreading hoods, of the bullock teamsters and Italian throwbacks, on the piled-up piles of architecture—and then my friends, you'll see things.

Buy a few history books, and as you read them amidst these scenes of preserved antiquity, you can relive the times of the Caesars and the Pharaohs, the periods of Richard the Lion-Hearted and St. Paul the Evangelist.

It is a place to go and dream, to forget, to lose oneself in the glories of the past.

* * *

No Refrigerators

Getting back down to earth, one must record the appalling information that a rather thorough combing of the streets of Valletta, principle city of Malta failed to reveal any refrigerators in showroom windows. If there were any refrigerator outlets in Malta, and I presume there surely must be, they failed to show their faces.

After returning home, I checked with a number of export managers to see if they had any distribution in Malta. The replies were all in the negative or the almost negative. Nobody gave us any special reason why refrigerators haven't been pushed there; and a quick study of the island yielded cognizance of no particular obstacles that we could see.

Hence, if anyone *should* want to go after that business, we have compiled a few facts and figgers about Malta, chiefly from official government tomes which we had access to on the island. If you demand lots of action and excitement in your reading, this may be a good time for you to go out for a smoke.

* * *

Geography & Climate

Malta is situated in the heart of the Mediterranean Sea, about 60 miles south of Sicily, and 180 miles east of Tunis. It is the largest of a group of five islands: Malta, Gozo, Comino, Cimminotto and Filfla.

Gozo lies about five miles to the northwest of Malta across the strait of Flieghi, in which is the islet of Comino. Cominotto is even smaller than Comino, and is off the latter's east coast. Filfla, which forms the target for gun practice of the British battleships, is to the south of Malta.

Seventeen miles in length and nine miles in width, Malta resembles a crude oval. The highest point on the island is 800 feet above sea level. Cliffs rise abruptly from the sea on the southwest shore to a height of between three and four hundred feet, slope up to slightly greater elevation, and then gently grade down toward the northeast. In the north, the Bingemma Hills run across the island at right angles to the main ridge.

The climate is mild in winter, and balmy in summer. In the cool season, which lasts for about two-thirds of the year, the shade temperature averages around 65°, and ranges from 50° to 70°.

Summer lasts from June to September, and the heat occasionally reaches 90° in August periods. Over a space of twenty years, from 1914 to 1934, the mean average temperature, in the shade, was sixty-six and two tenths degrees. The highest mark recorded in that time was a hundred and three and eight tenths degrees in 1931.

In 1923 the mercury hit the lowest mark of the two decades—thirty-nine and three tenths degrees. Snow is a rarity in Malta. In summer there are spells of oppressive humidity when the damp southeast wind, known as the Sirocco, blows over the land.

Parts of the Maltese summer are very hot and dry, and the dust is a nuisance. The sandfly thrives in the climate of Malta, making life miserable for the inhabitants by transmitting sandfly fever. This malady results from the bite of the insect, and is marked by throbbing headaches. Maltese mosquitoes, though possessed of a sharp sting, do not carry the germs of malaria.

As you can readily see from this dry summary (no, we're not punning) of climatic conditions in Malta, the place is ripe for enterprising cultivation by refrigeration and air-conditioning salesmen.

Malta has *no lakes or rivers*, and must depend upon the rain for its water supply. The rainfall, irregularly spasmodic, averages from 20 to 24 inches per year, the bulk of it falling between October and April.

Malta has two splendid natural harbors, the Grand Harbor of Valletta and the Marsamuscetto Harbor of the suburb of Sliema. The former is the more important, and is—or has been—the anchorage basin for huge British dreadnoughts. Marsamuscetto harbors the destroyer flotillas of the British Mediterranean fleet.

* * *

Population

As enumerated in April 1931, the population of the Maltese Islands was 241,621, of whom 117,457 were males and 124,164 were females. With the addition of the British Garrison stationed in Malta, including officers, their families, the Navy, the Royal Air Force and the Merchant Shipping, the total number of inhabitants, exclusive of the British fighting force, mounted to 258,400.

The first census of Malta taken in 1632 placed the population at 54,463. Malta and Gozo are the only inhabitable islands of the group, and in December, 1933, it was estimated that their total populace had increased to 251,832.

In the last decade (1921-1931) the average birth-rate was thirty-three per thousand as against a death-rate of twenty-two and a half per thousand. The native people are of mixed European stock, sturdy, peaceful and industrious.

* * *

Culture

Languages spoken in Malta are English, Italian, and Maltese, the latter being of Semitic origin, and said to have been derived from the Phoenician and Arab tongues. Italian, I should judge, is probably the most commonly used in the cities. Catholic religion is universal among the natives. About every third man—just as in Burma—seems to be a priest. The religion seems to permeate everything there.

Malta has three theaters, two in Valletta and one in Sliema, and a handful of cinemas, which go in for "thriller" movies. There are two libraries, the Public Library in Valletta, and the Garrison Library, also in Valletta and open to the public. The Valletta Museum, which now includes the Museum of Natural History is made up of four sections: archaeology and history, natural history, mineralogy, and fine arts. The first section is the intriguing one, for it deals with Malta's exceedingly romantic past.

Education is not compulsory in Malta, yet there has been steady progress in this field since the reorganization of the Government schools in 1880. These 200-odd government elementary schools are Roman Catholic, but free. Also there are 68 private elementary and secondary schools.

Chief of the latter are the Lyceum and St. Edward's College. In the Lyceum are offered two courses of study—Classical and Modern—in which young men are prepared for admission to the University, to the Civil Service, or for the field of commerce, electrical engineering or marine engineering.

Girls in the secondary school are taught French, needlework and other domestic subjects, in addition to English, Italian and arithmetic. Boys are taught Latin, algebra and geometry, history and geography, writing, and religious doctrine.

St. Edward's College is an institution for boys, founded and endowed by Lady Strickland, and opened on October 1, 1929. Its aim is to fit the Maltese boys for matriculation in the English Universities, for the Civil Service and for the British Navy, Army and Air Force.

The rector and vice-rector are priests of the diocese of Westminster, and the members of the faculty are, for the most part, graduates of the Universities of Oxford, Cambridge, and London. Students are admitted between the ages of eight and 12 years, and remain until the course of schooling has been completed.

Higher education was introduced into Malta in 1592 when the then-reigning Bishop invited a group of Jesuits to come and open a college. The Jesuit institution began its work in 1602, but in 1639 the Jesuits were expelled from the island, and school closed. Not long afterwards, though, they were permitted to return and carry on their work, which they did until 1768, when they were again ousted.

The confiscated property passed into the hands of Order of St. John by Papal authority (thus retaining its Catholic nature and control) and in 1769 the University of Malta was established in the ex-Jesuit College buildings.

The University of Malta has six schools: literature, science, engineering and architecture, medicine and surgery, law and theology. It is not self-supporting, and the annual average deficit of forty pounds per student is made up out of public funds.

Agriculture is by far the most extensive and important occupation in Malta. In the two main islands, one

(*Concluded on Page 7, Column 1*)

Residents of Malta Still Live in Middle Ages

1. Priests comprise a large portion of Malta's population. 2. Maltese women carry their burdens on their heads as they traverse the narrow streets. 3. Note the voluminous hoods of the women in the foreground.

Malta Is Important to British Navy

1. Malta is a natural citadel, bristling with masonry. 2. "Honest, officer, I was minding my own business." 3. British cannon stand guard—and so do British "Tommies."

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Around the World

With George F. Taubeneck

(Concluded from Page 6, Column 5)

reads there are 42,063 acres of land under cultivation. The average size of the holdings is only three and sevententh acres. That, your rural American would agree, isn't much of a farm. But divided into such small parcels, the land supports practically the entire population.

Crops extensively cultivated include forage, wheat, barley, potatoes, beans, onions, cumin, cotton, tomatoes, citrus fruits and a few other legumes and fruits.

Because of the size of individual farms, plus antiquated agricultural methods, Malta imports more foodstuffs than she exports.

Malta's lace is coveted by women the world over. Its wines are appreciated by connoisseurs; and one tobacco factory there turns out a very expensive brand of cigarette which is in high favor all over Europe—among those who can afford to pay 80 cents for a package of 25.

Malta's principal industries include fishing, lace, soap, wine, beer, and tobacco.

Wages for labor average from one shilling to one and a half shillings per day plus boarding for the domestic servant trade, from three to four shillings per day for the predial (farmhand) trade, and from four and a half to six shillings per day for other trades.

Since a shilling is equivalent to 24 cents in American money, it is evident that wages in Malta are comparatively low. The best-paying trades bring only about $1.40 per day.

* * *

Finance & Government

Every item of expenditure for public works in Malta since the British rule began has been paid out of the general revenue. No loan has ever been contracted for work of this nature.

The legal tender currency has been exclusively British since September, 1886, and by this time the estimated total amount in circulation is £985,000.

There is no income tax. An ample means of revenue for the government is the Public Lotto (lottery), a government monopoly. The "lotto" was established by an Act of Parliament in 1922, and annually nets the government £42,000.

There are three local banks, the government savings bank and branches of Barclay's bank, Credit Foncier and Banco di Roma in Malta. If you are an American, you transact your business with and through the Barclay bank.

The Governor is the head man in Malta, being appointed by royal decree. There is a legislature, composed of the Senate and the Legislative Assembly. The Senate contains 17 members, elected for six years, eight of whom form a quorum. Ten of them are "Special Members" and represent, in pairs, the clergy, the nobility, the college graduates, the chamber of commerce and the trade union council. The remaining seven are "General Members" elected from the two constituencies of Valletta and environs, which returns four, and the remoter portion of Malta and Gozo, which returns three.

Voters must be male British subjects over 21 years of age, able to read and write, and either paying £20 per year in rent, or possessing £20 per year income from real property in Malta or from other capital.

The Legislative Assembly contains 32 members, returned in groups of four from the eight electoral divisions, seven of which are in Malta and the other in Gozo. The same qualifications for voters in Senatorial elections hold good in Legislative Assembly elections, except that the 'value" is lowered to £5.

The Assembly term is three years. No person may be a member of both houses at the same time, and in case anyone is elected to both houses, as sometimes happens, he must take his choice.

In general, the Legislature takes care of local affairs, and the Governor, with the assistance of a Nominated Council, tends to certain Imperial interests.

Roman and Napoleonic laws form the basis for the Maltese laws of the present day. Commercial maritime laws are taken from the French Commercial Code, and contain provisions from the Merchant Shipping Act. Laws of criminal procedure are mainly based on the English system.

Trial by jury was instituted in 1829, the jury being composed of a foreman and eight jurors, whose verdict can be rendered on a two-thirds majority.

All facts passed by the Maltese Legislature and all ordinances passed by the Maltese Imperial Government become law as soon as they are assented to by the King of England and proclaimed as such.

Minimum wages have been set for a number of trades by the government. The Workmen's Compensation Act of 1929 requires every workman, male or female, to become a contributor to the Workmen's Compensation Fund, and both workmen and employers are required to pay into it a penny a week.

* * *

Valletta

Valletta, capital city of the island, is built on the promontory between Grand Harbor and Marsamuscetto Harbor. And what a promontory that is! Streets trail off into steps; a municipal elevator carries travelers from the docks to the business section; and no resident dares walk in his sleep.

The foundation stone of the town was laid by Grand Master Jean de La Vallette on March 28, 1566. Pope Pius V greatly aided in the development of the city by giving large sums of money for the purpose.

The foundation stone of St. John's Cathedral was laid in 1573. This magnificent temple contains a chapel for each of the original eight languages of the Order of St. John, has 10 huge bells in the belfries; and has a large, three-faced clock that indicates the hour, the day of the week, and the day of the month.

The massive governor's palace, begun in 1572, stands in a square in the middle of the city. Its clock, also a dandy, was installed in 1745. The lower floor of the building contains the government offices, and the upper floor forms the Governor's residence. There are four large halls open to the public. The roof serves as a military signal station and an observatory from which uniformed sentries constantly train eagle eyes on the horizon.

Since Italy's power has rejuvenated these sentries no longer yawn at their work; for it has been said that Mussolini's airplanes could sink the British fleet in Malta's harbors in less than an hour!

Seven of the original eight "Auberges," as the residences of the Knights of the Order are known, still remain in good condition. Each used to house the Knights according to their nationalities. They are large, imposing buildings of chaste design and valuable furnishings.

Built in the years 1859-62, the Market is a large, square, airy building facing the background of the Governor's Palace. It is divided into five avenues of stalls with stores below, providing the public with fresh edibles. No refrigeration is in sight.

Fort St. Elmo was built in 1488 at the extreme point of the city, where it commands the entrances to both harbors. In 1533 it was rebuilt and enlarged. The Turks overwhelmed its defenders during the Great Siege of 1565, and today it is reckoned of little value by military strategists. It has a lighthouse, erected in 1766, with a light which has 15 miles radius.

Two popular and beautiful public gardens of the city—and well worth visiting—are the Upper and Lower Barraccas, each of which contains a number of monuments and statues recalling great men and important incidents in the history of the island.

As a thank offering for the recovery of her health in Malta, the Dowager-Quene Adelaide provided a fund for the building of St. Paul's Anglican Cathedral. The foundation stone was laid on March 20, 1842. The church is a large, simple oblong building in the Ionic style, rising at the entrance of the Marsamuscetto Harbor, and is visited by most tourists.

The only railway in Malta is that running from Valletta to Notabile and back. One-way distance is about eight miles, the trip being made in the amazing time, for Malta, of half an hour!

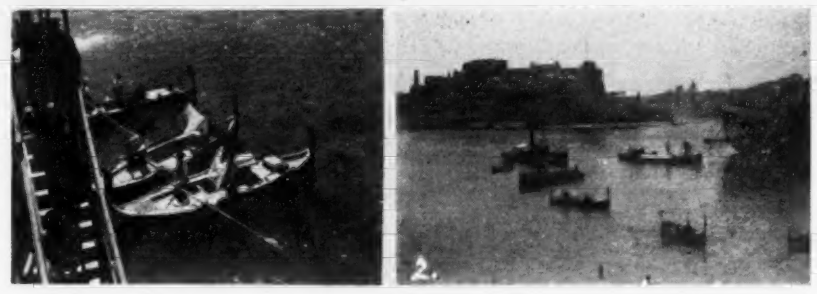
The station at Valletta is underground, and the train does not emerge to the surface until the wall of the city has been passed. Before reaching Notabile, the train again takes to the underground, stopping at the Museum Station on the other side of the town.

Malta is not a poor place for motoring, although a car is practically a necessity for travel into the interior. The streets are narrow, the roads are walled in and twisting, the Maltese are blandly impervious to the toots of horns, and the surface becomes dangerously slippery in wet weather. Any prospective driver must obtain a license to operate a vehicle in Malta, another license to operate a machine in the city of Valletta, and yet another license to drive on the Strada Reale, the main street of Valletta.

Malta's tram (electric railway) service stops at the gates of Valletta, for no tramcars are permitted inside the city. Within the city practically the only vehicles one sees are ox-carts, with an occasional motor delivery wagon. Everybody walks.

The Pre-Lent Carnival is an interlude of bubbling gayety and high spirits. Streets are strewn with confetti and streamers, people cavort in costume, fireworks are exploded, lights are bright, and the general babble of noise is intoxicating. This spasm of exuberance lasts for about a week, and is said to be the time to visit Malta.

Malta's Romantic Harbor



1. Intricate Maltese laces are offered to a shore party leaving a ship.
2. Malta's famous harbor, as viewed from the northern ramparts.

Suicide and attempted suicide are more common in Malta than murder, but crime in general is no serious problem. Religion is said to be responsible for the absence of crime. Dullness of the existence, I presume, instigates the suicides.

Water rates in Malta:

3d. per 1,000 gallons for first 3 gallons per head per day.

1s. 3d. per 1,000 gallons for second 3 gallons per head per day.

1s. 6d. per 1,000 gallons for third 3 gallons per head per day.

2s. per 1,000 gallons for fourth 3 gallons per head per day.

2s. 6d. per 1,000 gallons for any quantity above the fourth scale.

Water is also charged for at a uniform rate of 1s. 8d. per 1,000 gallons in a number of instances.

Electricity current rates per unit:

1. Current supplied for lighting:

a. for consumption not exceeding 200 units per quarter, 5d.

b. for consumption over 200 but less than 400, subject to minimum charge of £4 3s. 4d., 4½d.

c. for consumption over 400 but less than 600, minimum charge of £7 10s., 4d.

d. for consumption of over 600 but less than 800, minimum charge of £10, 3½d.

e. for consumption over 800, minimum charge of £11 13s. 4d., 3d.

2. Current supplied for power or heating

a. during off-load period (midnight to 7 a. m.), ½d.

b. during light-load period (7 a. m. to midnight)

1. for consumption less than 5,000 units per quarter, 2d.

2. for consumption over 5,000, but less than 10,000, subject to minimum charge of £41 13s. 4d., 1½d.

3. for consumption of more than 10,000 but less than 15,000 minimum charge of £62 10s., 1¼d.

4. for consumption over 15,000 but less than 20,000, minimum charge of £78 2s. 6d., 1d.

5. for consumption over 20,000 but less than 30,000, minimum charge of £83 6s. 8d., ¾d.

6. for consumption over 30,000 but less than 40,000, minimum charge of £93 15s., ⅝d.

7. for consumption over 40,000, subject to minimum charge of £104 3s. 4d., ½d.

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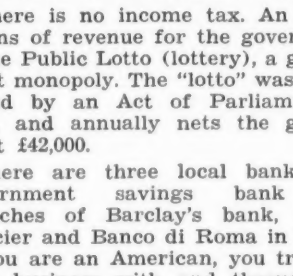

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The Problem of Trade-Ins

DEALERS and distributors in many parts of the country are convinced that the biggest problem which will face the nation's refrigeration merchandisers next year, and probably the immediately ensuing years, is the trade-in dilemma.

The automobile industry, with its yearly models, has educated the public to the trade-in idea. Radio has helped it along. So has the washing machine industry, the vacuum cleaner business, and many another—even down to automobile tires and batteries. People have been taught to expect something for their old model whenever they purchase a new one, and have got so they bargain with retailers, giving their business to the one who allows the most for the trade-in (of whatever product is concerned in the deal).

Not having old electric refrigerators to trade-in, oftentimes a household refrigerator prospect brings in other articles. Iceboxes, of course, head the list. Pianos are frequently offered. So are radios, phonographs, stoves, washing machines, and whatnot. Farmers have been known to bring in sacks of wheat and corn, pigs and chickens, and once-in-a-while a cow or a mule. The NEWS has recorded instances of pedigreed dogs being taken in for the down payment, Model T Fords, and moonshine whiskey.

And now a rising portion of household refrigerator sales are being made to homes which already possess an electric or gas refrigerator. The replacement market has definitely arrived; and with it, the attendant worry of what to do about the used refrigerators offered in trade.

Refrigerators Not Priced to To Allow for Trades

The troublesome factor in the situation is that electric refrigerators have not been priced to allow for trade-ins. Competition has brought retail prices down to rock-bottom, to a point where no padding can be tolerated. This is in high contrast to other products, particularly automobiles. That considerable leeway is allowed for the trade-in car in the price of a new automobile is a fact known to every man who purchases a new car on a "clean deal" (no trade-in), for the price always comes down several notches when the salesman learns that no used car is involved.

Prospects, then, are frequently offered the actual value of their used refrigerator when they suggest it as part payment on a new one. Incensed at what they consider a ridiculously low offer, they peddle their used box from dealer to dealer until finally they find one who yields to the temptation to cut the price by naming a high trade-in value on the old box.

Thus a dealer who has spent time and money building up the sale sees his efforts go to naught while a chiseling price-cutter gets the business. He, too, may be tempted to go and do likewise. Soon the entire dealership of a community will be in an uproar, with a trade-in appraisal war just as disastrous as the old-fashioned variety in which list prices were competitively and progressively slashed.

To prevent such messes a number of different schemes have been proposed, and some tried. One method is to get all the dealers of a community together and agree on an arbitrary allowance—say, 10% of the list price of the new box—on trade-ins. This has worked in cities where a strong association has things under control.

Some Cities Have an Official Appraiser

Another method—one which has worked out most successfully in Chicago—is to accept one man as the official appraiser for used refrigerators, and make his company a clearing house for trade-ins. His name becomes associated around the town with second-hand refrigerators. People who want them go to his store. And eventually, after the "shopper" has been told by the fourth or fifth dealer that "Mr. X will buy your old refrigerator," he accepts the fact that Mr. X's offer is what he will get, and no more.

A number of dealers and distributors have suggested that what the industry needs is a "Blue Book," similar to the one used by automobile dealers, quoting standard prices on used cars of all models. One inherent difficulty with such a project is the different values which must be assigned to refrigerators in different localities. A 1931 Kelvinator V-16 which had sweltered steadily through the heat and humidity of New Orleans, for example, would probably be worth much less than the same model after a similar period in Minneapolis.

The Foundation for a "Blue Book"

However, the 1936 REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS, now being mailed by the Business News Publishing Co. to long-denied purchasers, is a step in that direction. With this book as a guide to the models, local associations may be able to work out their own price allowance schedules, at least temporarily.

Still other methods of handling the trade-in dilemma are undoubtedly being mulled over by dealers and dealer associations around the country. As fast as such schemes are worked out, the NEWS will endeavor to report them. So important is the subject, and such bearing does it have on the future of refrigeration merchandising, that every solution to the dilemma which is presented should be weighed carefully by dealers everywhere.

As important as trade-ins are today, they are playing a decidedly minor role (in what could easily be a tragedy!) compared with the part they will assume in the reasonably near future. It is a question which the industry *as a whole* can no longer afford to neglect. A sound, thoroughly acceptable policy toward trade-ins should be established before the matter gets out-of-hand.

Now that we have the SPECIFICATIONS BOOK as a basis, Business News Publishing Co. may undertake the job of providing the "Blue Book." We don't mind admitting, however, that we are not terribly keen about the proposition, because we know in advance that there will be bitter complaints and charges of favoritism, no matter what prices are set. We have an idea that if others worry with the problem awhile, the industry will be more willing to accept the services of an *independent* publisher.

People Need Homes

RENTS ARE GOING UP. City apartments are becoming more and more difficult to obtain. The want-ad columns of the newspapers are no longer replete with long lists of houses to let. Now that the dark skies of depression are clearing, people are coming out of their holes, and looking for places to live.

The "doubling up" process, wherein two or more families moved in together to save rent, is undoubling. Those who went home to live with pa and ma until the storm blew over are now returning to the cities and jobs. They are leaving the farms again, and coming back to the factories. For the first time in some years, the housing situation has become acute in the major cities.

To the refrigeration and air-conditioning industry, of course, this state of affairs is highly significant. More than that, it is a challenge. Obviously a boom in the building trades is going to follow a shortage in dwellings. In some cities—Detroit, for example—new houses are going up very fast. In others, apartment houses are being constructed, and additions being built onto hotels.

For every apartment, for every new home, there must be a household refrigerator—or the apartment cannot be rented, or the house sold. Air conditioning, likewise? Yes, in somewhat lesser degree. Most prospects feel that they aren't buying a modern home if it isn't air conditioned; and the idea is just beginning to take root among apartment dwellers.

Who is going to get this business? Right now it would seem that large distributors with active "contracting" departments should be in the best position. Salesmen who have been accustomed to contacting the building trade and the apartment house operators will have a line on who is building what and when, and should be there with order blanks at bidding time. As in the past, price will undoubtedly be a factor when speculative builders place quantity orders.

Man Who Builds His Own Home Wants Quality

Not all homes are put up by speculative builders, however. To many a man the dream of building his own home is something which has been cherished all his life; and now that business is looking up and money is cheap, he may decide that the time is ripe for his dream to come true. This type of prospect is made to order for the dealer who knows the man, and whose advice and personal interest may be welcomed. What's more, the prospect in this category can be sold on quality and long life, as against mere price.

But no matter who gets the business in the end, the entire industry should benefit from the extra volume which should be forthcoming in the immediate future from the budding building boom.

Letters

New Directory to be Published in 1937

General Electric Co.
1 River Rd., Schenectady, N. Y.
Sept. 25, 1936.

Gentlemen:

Will you please answer the following questions at your convenience?

Is the 1935 edition of the REFRIGERATION AND AIR CONDITIONING DIRECTORY AND MARKET DATA BOOK the first time you have divided this publication into two sections, i.e. two paper covered books?

Do you intend to follow the same procedure in method of publication for 1936?

When do you expect the 1936 issue to be ready for the trade?

Supplementing the second question, will you divide it into two or three sections or will it be a single covered volume?

J. A. HILLS,
Publicity Department.

Answer: The first REFRIGERATION DIRECTORY AND MARKET DATA BOOK was issued in 1932. It was a green cloth-bound book of 470 pages.

In October of the same year we issued a red paper-back edition of the same book with a supplement of 120 pages (printed on pink paper) bound in. The supplement contained specifications of household electric refrigerators, an air-conditioning directory, and additional sales statistics.

The next edition was the 1934 REFRIGERATION DIRECTORY AND MARKET DATA BOOK which contained 692 pages and had gray paper covers with a yellow cloth tape binding.

In 1935 we issued two books: Volume I—REFRIGERATION AND AIR CONDITIONING DIRECTORY of 383 pages. Volume II—REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK of 304 pages. Both books had dark green paper covers with tan cloth tape binding.

We have given up the idea of publishing a revised edition of these books during 1936, but we have definitely planned a new edition of the REFRIGERATION AND AIR CONDITIONING DIRECTORY to be issued early in 1937.

No definite announcement has been made regarding a new edition of the MARKET DATA BOOK.

Wanted by the Police

City of Hagerstown
Department of Police
Hagerstown, Md.
Sept. 23, 1936.

Gentlemen:

Referring to your letter dated Sept. 16, 1936, addressed to Mr. L. J. Ramacciotti, The Lamp Shoppe, 45 S. Potomac St., Hagerstown, relative to Ray Shaw, wanted in this city for passing fraudulent checks.

Ray Shaw, white, age about 37, 5 ft. 10 in. tall, 160 lbs., dark hair, thin over temples, very neat dresser, is wanted by this Department for issuing fraudulent checks, warrant having been issued on Aug. 27, 1936.

Ray Shaw, a former Norge refrigerator salesman, passed two checks in this city, using the name of Mr. L. J. Ramacciotti. He is likewise reported to have cashed several checks with dealers handling Norge refrigerators in the state of Pennsylvania, recently. He seems to specialize on Norge dealers.

We will extradite, if apprehended. Thanking you for any assistance you may be able to render in effecting his arrest.

C. G. EMMERT,
Chief of Police.

The Dutch Market for Air Conditioning

Mauritslaan 29
The Hague, Holland
Sept. 17, 1936.

Editor:

The editor's article under the headline, "The Market for Air Conditioning Abroad," in the NEWS of Aug. 26 caught my eye, especially where the writer mentions the Dutch East Indies (Java, Sumatra), as I have been there.

The first time I came across any demand for "room cooling" for that part of the tropics was in 1928, when Prof. Clay of the Bandoeng University visited me and put the question before me. Those days were too early and the automatic machines not big enough for the job.

Being a Hollander and having opened the market for refrigeration in Holland in 1927, I know what is wrong with air conditioning in the Dutch East Indies, and what is wrong with comfort cooling in Holland.

The latter will never be a good market, as the climate is cold, and a heat wave in summer will not last more than a week, with a maximum temperature of 83° F. as an exception. Of more interest is the fact that well water is constantly at 54° F.

There are a few buildings air conditioned by way of the water curtain system, and no mechanical cooling is used. The air is cooled and cleaned but not dehumidified, which is not necessary for prevailing conditions.

I happen to know about one of these buildings, one of the managing directors being a friend of mine. His staff of about 700, and the management is content as it is. The installation has worked now for 10 years.

All is different in the Dutch East Indies. That will be a splendid market in years to come. When I started refrigeration in 1927 in Holland I had to educate prospects by means of lectures before associations in order to make them understand what cooling actually was.

I held these lectures before butchers, hotel people, hospital officials, etc. with good results. In their own tongue they got to know the possibilities. The newspapers were invited, and gave the story, and it spread.

When I met and talked with you, Mr. Editor, in The Hague this summer, I knew that you had spotted the Dutch East Indies right. With its big sugar, rubber, kinasisal, tea and pepper plantations, and industries, with its big and modern towns as Soerabaya, Semarang, Bandoeng, and Batavia with a population of 65,000,-000, there is a big market for air conditioning. But . . . they have to be told.

They have to be told; and the papers have to spread it that the common enemy: "the heat," has found its master by means of air conditioning.

If a combination of refrigerating manufacturers or their association sends out a capable man for four or five months to lecture in the above towns and a few others, and in Medan and Palembang (locations of Royal Dutch Shell wells and refinery plants) on Sumatra, eyes will be opened and orders will follow.

This promoter must have with him examples of equipment for room and bed cooling for rooms of a certain size, say 20x5x12 feet high by way of calculations, giving prices and results.

Calculators may reckon on a wanted temperature of 75° F., with an outside constant day and night temperature of 86° F. for the low lands where the towns are situated. Humidity is 88% during November-April, and 80% during May-October, with well water of 82° F. all the year round.

They can calculate cheap labor, cheap insulation, high prices for electric current. To give all the details will make this letter too long. I thank you, Mr. Editor, for the given opportunity to make some statements.

To cooperate in order to conquer the one big tropical enemy called "climate" is big work, but it can be done. Air conditioning is the "heaven" for which every white man in the tropics waits.

W. J. VAN WULFFTEN PALTHE.

We're Taking No Chances

Baker Ice Machine Co., Inc.
Omaha, Neb.
Sept. 8, 1936

Editor:

We would appreciate your advising us when you expect to have the commercial service manual available, in book form.

C. KING, Engineering Dept.

Answer: The COMMERCIAL SERVICE MANUAL will be published in book form "some time next year."

After the lesson we learned with the 1936 REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS BOOK (which was supposed to be ready for distribution in May and which is just now off the press), we are not making any more commitments on publication dates for books until we are sure that the book will be available for distribution on that date.

Exceedingly Interesting

Kold-Hold Mfg. Co.
Olds Tower Bldg., Lansing, Mich.
Sept. 17, 1936.

Editor:

Please accept our compliments and congratulations on the very fine Sept. 9 issue of ELECTRIC REFRIGERATION NEWS, which contains a vast amount of exceedingly interesting and valuable information.

We would appreciate receiving several additional copies for members of our organization, and if you will kindly forward six copies to us, together with invoices covering same.

W. G. FARNSWORTH, General Mgr.

Thanks, Mr. Carraway

Carraway Engineering Co., Inc.
Air Conditioning
Dallas, Texas.
Sept. 22, 1936.

Mr. Cockrell:

I thoroughly enjoyed your Tenth Anniversary Edition, and I have just finished your Announcement Folder containing purchase curves on household and commercial refrigeration, exports, and what may be expected in the future for air conditioning. This is really well gotten up, and most appealing. T. W. CARRAWAY.

Air Conditioning Is Future's Job Maker, Says Kettering

Air conditioning is one of the young industries which, by making proper use of engineering laboratories, has it in its power to create so much work that our problem would be a shortage of labor rather than a shortage of jobs, says Charles F. Kettering, head of research activities for General Motors Corp. in an interview with Boyben Sparks in an issue of the *Saturday Evening Post*.

"We have to admit," he says, "that there is an inescapable tendency in industry to save labor, to create machines to do the work formerly done by the muscles of men, women, and children. That is what machines are for. But what of it?

"After acknowledging or, if you like, confessing that we have at times considerable technological unemployment, I say the cure is in taking a larger dose of the medicine that caused our ailments. But instead of wringing our hands over technological unemployment, let us take advantage of the same technological capacity to create an abundance of new kinds of employment, and in this way get a balancing factor. We need a lot of improvements worked into our lives, which is simply a way of saying that we need more industries. How much more do we need?"

Air Conditioning Development Slow

"Things do not always come fast merely because science has had a hand in their development. Consider air conditioning. It has been rather slow, but I can show why, I think.

"Even the cave man knew how to produce heat; he could do that by rubbing his hands together; he got fire by rubbing two sticks together. But it was a long time before men tried to produce cold.

"Then, in laboratories, men discovered that they could make ice artificially, regardless of weather. That discovery gave us a new industry and permitted an extension of the benefits of refrigeration to people who formerly could not afford it.

"Then somebody made a cold-storage plant that was simply a vast refrigerator unit. That was a new industry. Then the thing was reshaped, and not so long ago we began to find midget-proportioned specimens of the same sort of instrument in everybody's kitchen. This was another industry, a giant.

"Curiously, these giants occur only as we learn to make something in a small shape that everybody can use; it is an important part of the genius of America to do that.

"Well, then somebody, pondering on the sad state of the motion-picture-theater business in summer, when houses were either shut down or else getting skimpy, unprofitable audiences, decided to install a special kind of atmospheric-controlling machine in a theater.

"Anyway, we have another industry, and the theater everywhere is adjusting itself to the delightful fact that it now has a season 12 months long. The thing began to extend itself floor by floor into department stores, and they began to get better summer business, too, out of which will come other unpredictable changes.

"Some live railroad men decided to air condition a train, and as this mechanism was applied to more and more trains, there began an astonishing revival of rail travel. Formerly you could not have hired me to ride a train across the desert in summer; I did it this year, and was never more comfortable.

Midget Size Conditioner Next

"What next? Obviously the thing to be done, the thing that will be done, is to scheme and struggle with this same scientific principle until we have made a midget use of it. When we can turn out midget-size air-conditioning plants, we will have something, I suspect, that will rank with the automobile as a job-making enterprise.

"Oh, now the thing is coming, and faster than most persons might suppose. But think how long, how needlessly long, you have waited for it!

"I have enjoyed the comfort of air conditioning in my house since I built in, more than 23 years ago. I tried to buy a plant to do what I wanted. I could not find anybody to sell it to me; they all threw up their hands in amazement at my suggestion. I personified a great market which had been existing, and exists now, for this utensil for comfortable living, but they simply wrote me down as a visionary.

"So I bought what was needed to harness a well-understood scientific principle, and made my own air-conditioning plant. That is just one of the compensations of being an independent sort of mechanic. The point I want to make is that, socially, we cannot afford to take so long to de-

(*Concluded on Page 10, Column 1*)

Chicago Air-Conditioning Installations During August, 1936

Name and Address of Customer	Class of Business	Tons	Hp.
Doctors & Dentists			
Barker, Dr. M. H., 700 N. Michigan	Doctor-Dentist	½	½
Rubel, Dr. Maurice, 25 E. Washington	Doctor-Dentist	½	½
Hospital			
Presbyterian Hospital, 1753 W. Congress	Hospital (Pat. Room)	½	½
Candy Manufacturers			
Andes Candies Co., 357 N. Central Park	Industrial, Candy	10	10
Curtis Candy Co., 259 E. Illinois	Industrial, Candy	75	90
DeMet's, 312 W. Madison	Industrial, Candy	3	3
McLean, A., & Son, 350 W. Ontario	Industrial, Candy	7½	7¾
General Offices			
Chicago Park District, 1225 Lief Erickson	General Office	7½	8½
Grasselli Chemical Co., 2101 Canal Port	General Office	20	23
Metro-Moldwyn-Mayer, 1327 S. Wabash	General Office	18	20½
Peoples Gas Light-Coke, 122 S. Michigan	General Office	10	10
Private Offices			
Amer. Conservation Co., 307 N. Michigan	Private Office	½	½
Kroger Grocery-Bakery, 8235 S. Vincennes	Private Office	¾	¾
Exhibit Supply, 4222 W. Lake	Private Office	¾	¾
Great Lakes Mortgage Co., 184 W. Lake	Private Office	3	3
Inland Press, 328 S. Jefferson	Private Office	½	½
Radio Artists Assn., 32 W. Randolph	Private Office	½	½
Residences			
Edward Dowd, 2625 W. 106th St.	Residence	½	½
S. N. Shure, 1327 Lunt Ave.	Residence	½	½
A. Vignola, 4926 N. Albany	Residence	½	½
Restaurants			
Beverly Club (Add.), 8045 S. Ashland	Restaurant	10	10
Chicago Radio Club, 433 N. Wells	Restaurant	7½	9½
Harry's Wonder Bar, 9 E. 79th St.	Restaurant	10	10½
Candy Stores			
Dutch Mill Candy Corp., 4048 W. Madison	Store, Candy	5	5½
Dutch Mill Candy Corp., 3327 W. Lawrence	Store, Candy	5	5
Dutch Mill Candy Corp., 1636 E. 55th St.	Store, Candy	5	5
Bakery			
Heinemann's Bakeries, 5600 Broadway	Store, Bakery	7½	9
Funeral Parlors			
Drake & Son, 5200 N. Western	Undertaker	5	5
Total—28 Installations		215	241¾

Air-Conditioning Installations Made on the Potomac Edison System, Hagerstown, Md.

Name and City	Manufacturer	Tonnage
Apartments (Private)		
Prior to 1935		
Joseph D. Baker, Francis Scott Key Hotel, Frederick, Md.	Frigidaire	1½
E. Foster	Frigidaire	½
Banks		
Prior to 1935		
Second National Bank, Cumberland (Executive Office)	Frigidaire	1½
During 1935		
First National Bank, Cumberland (President's Office)	Frigidaire	½
Candy Stores		
Prior to 1935		
Queen City Candy Co., Cumberland	Frigidaire	½
1936		
Princess Confectionery, Hagerstown	Kelvinator	3
Clubs		
During 1935		
Elk's Club	Frigidaire	6½
Doctors' and Dentists' Offices		
Prior to 1935		
Dr. J. Russel Cook, Cumberland	Frigidaire	½
Dr. W. R. Hodges, Cumberland	Frigidaire	½
During 1935		
Dr. C. E. Broarcup, Frederick	Frigidaire	¾
Dr. A. K. Leon, Frederick	Frigidaire	1½
Dr. W. E. Trail, Frederick	Frigidaire	½
Dr. E. B. Wood, Cumberland	Frigidaire	½
1936		
Dr. G. Thomas Strother, Brunswick	Frigidaire	¾
Fur Storage		
During 1935		
Anderson Dry Cleaning Co., Hagerstown	Frick	1½
Jewelry Stores		
1936		
Harvey's Jewelry Store, Cumberland	Frigidaire	3
Laboratories		
During 1935		
Portland Cement Co., Union Bridge	Frigidaire	¾
Offices		
1936		
Cumberland Brewing Co., Cumberland	Frigidaire	½
Nolan Motor Co., Hagerstown	Frigidaire	½
Ox Fibre Brush Co., Frederick	York	10
Power Company Installations		
Prior to 1935		
Cumberland Appliance Store (Private offices, clerical off.), Cumberland	Frigidaire	10
District Manager's Office, Hagerstown	Frigidaire	½
District Mgr.'s Office, Waynesboro, Pa.	Frigidaire	¾
Home Service Hall, Martinsburg, W. Va.	Frigidaire	1
During 1935		
Frederick Appliance Store, Frederick (Private Offices)	Frigidaire	10
President's Office, Hagerstown	Frigidaire	1
District Manager's Office, Winchester, Va.	Frigidaire	¾
1936		
Vice President's Office, Hagerstown	Frigidaire	¾
Gen. Commercial Mgr.'s Office, Hagerstown	Frigidaire	¾
Radio Stations		
Prior to 1935		
WJEJ (Broadcasting Studio). Hagerstown.	General Electric	1
During 1935		
WTBO (Broadcasting Studio), Cumberland	Frigidaire	½
Residences		
Prior to 1935		
H. W. Price, Cumberland	Frigidaire	1
1936		
Tasker Lowndes, Cumberland	Frigidaire	½
Dr. Howard W. Yeager, Hagerstown	Frigidaire	½
Restaurants, Tap Rooms, Etc.		
Prior to 1935		
Hershberger's Dining Room, Frederick	Frigidaire	6
Alexander Hotel, Hagerstown	Frigidaire	6
During 1935		
Hamilton Hotel, Hagerstown	General Electric	3
White Palace Restaurant, Winchester, Va.	Frigidaire	6
1936		
Beck's Tavern (Dining room, Tap room, dance floor), Hagerstown	Westinghouse	15
Sanitary Restaurant, Martinsburg, W. Va.	Frigidaire	6
Stores (Department)		
During 1935		
Cumberland Cloak & Suit Store, Cumberland	Frigidaire	9
1936		
Cumberland Cloak & Suit Store, Cumberland	Frigidaire	3
Theaters		
Prior to 1935		
Embassy Theater, Cumberland	York	20
During 1935		
Imperial Theater, Brunswick	Frigidaire	10
1936		
Imperial Theater, Brunswick	Frigidaire	10
Undertakers—Funeral Homes		
1936		
F. E. Grove & Son, Waynesboro, Pa.	Frick	5

Mr. Fitting on the Run!

WHAT a run Mr. Fitting can make! Without him in the game no refrigeration team can ever make a touchdown. He holds the ends, he tackles the tees, and stands like a rock against powerful back pressure.

No line is stronger than its guards. Mr. Fitting is ubiquitous—he is end, center, back, tackle and guard combined and the strongest player on any assembly of refrigeration components.

As in football, so in refrigeration. Not all fittings are equally sturdy or so well balanced as others. It pays to pick winners and when a seasoned player is available he gets the preference over untried talent.

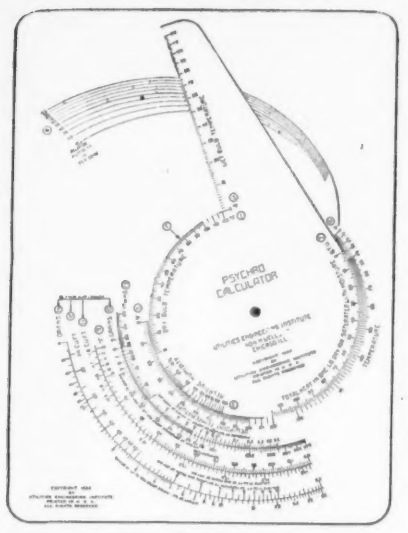
Mr. Fitting of Commonwealth is an old performer. For 25 years he has been holding the line for refrigeration—on the run and at end and back. Commonwealth is proud of the record made in the stiff competition for popular favor.

No matter what position Commonwealth Fittings are required to play—and this well-known family has many representatives—**they deliver.** Customers know that these sturdy fittings, constructed from hot forged brass and extruded rod, are "Built Right to Stay Tight" and in consequence there are no leaks or seepage at any point where Commonwealth Fittings are in place.

Follow the experience of leaders of the industry and specify Commonwealth if you would have dependable fittings.

COMMONWEALTH
BRASS CORPORATION
Commonwealth and G. T. R. R. DETROIT

Conditioning Aid



Reproduction of the "Psychro-Calculator" announced by Utilities Engineering Institute.

• • •

U. E. I. Introduces Psychrometric Calculator

CHICAGO — Utilities Engineering Institute here has just introduced the "Psychro-Calculator" to be used in determining psychrometric values and properties of air and water vapor mixtures.

The Psychro-Calculator makes it possible to obtain, in one setting of a movable indicator, any two of the four psychrometric values — Dew Point; Dry Bulb; Wet Bulb; and Relative Humidity—when the other two are known.

In addition to serving the purpose of the psychrometric chart, the Psychro-Calculator will give such values as weight of saturated vapor per lb. of dry air in grains; vapor pressure in inches of Hg; and weight of saturated vapor per ft.^{3} in grains by reading direct from the dew point temperature.

Values found from the wet bulb temperature are: total heat in B.t.u./lb. of dry air with vapor to saturate; and the difference in total heat of any two wet bulb temperatures.

Values that may be read directly from the dry bulb are: Volume in ft.^{3} of one lb. of dry air, without any adjustment; and the volume of moisture to saturate one pound of dry air. These values make it possible to easily evaluate any partially saturated mixture from 0° to 120° F., engineers of the Institute claim.

Instructions for the settings are printed on the reverse side of the calculator. Values can be read to two or three significant figures, depending upon the location on the scales, which confines the percentage of error in the final calculations in air-conditioning work within restricted limits. All values found on the scales are based upon the standard barometric pressure.

The Calculator is 7½x10½ inches and is finished with a surface that can easily be cleaned when soiled.

Air Conditioning Coming Fast, Kettering Claims

(*Concluded from Page 9, Column 1*)

velop these things nowadays, because we need to make jobs.

"If society is to survive, if we are to avoid another spell of the Dark Ages, the obsolescence factor must be better understood. In this great national task of creating work . . . we have got to speed up obsolescence . . . to indoctrinate ourselves with the belief that no article should be kept off the scrap heap longer than it takes to provide a better article. This is not waste; waste comes when we cling too long to the old things, such as outmoded buildings.

"A few years ago an insurance company arranged for the construction in New York of an air-conditioned skyscraper. The special equipment probably cost about $500,000. But I venture to say that if the full truth were known about the improved health and year-round efficiency of the men and women who are fortunate enough to work in such a building, all of us would begin to clamor against buildings and houses not air conditioned, because they are dangerously obsolete.

"It is entirely wrong for us to go on deluding ourselves by wrong methods of bookkeeping. It is not wasteful to tear down an old building when a better building can be put in its place. It is not wasteful to scrap old machinery when it becomes outmoded; real waste is in failure to scrap some outmoded ideas about thrift. Nothing could be more wasteful than to spend your life living less effectively than is possible."

Air Conditioners in Territory of San Joaquin Light & Power Co., Fresno, Calif.

Name and City	Manufacturer	Hp.
Apartment Houses		
Prior to 1935		
Palms Apartments, Fresno	General Electric	12.00
Banks		
Prior to 1935		
Bank of America, Bakersfield	York	88.00
Beauty Parlors		
During 1935		
Flanigans, Fresno	P. & R.	1.75
Grills & Restaurants		
During 1935		
Ambros Bros., Fresno	General Electric	13.25
Gibley's, Fresno	P. & R.	1.25
Hotel Fresno, Fresno	Frigidaire	3.20
Monmarte Club, Fresno	Westinghouse	12.80
The Drink-O-Link, Bakersfield	Frigidaire	12.50
Omar Khayyams, Fresno	Frigidaire	17.25
1936		
Pleasanton Cafe, Fresno	Frigidaire	11.00
Brown's Lunch, Merced	Carrier	6.00
Hart's Lunch, Fresno	Westinghouse	30.00
El Tejon Hotel, Bakersfield	Chrysler	22.00
Tiny's Waffle Shop, Inc., Fresno	York	11.00
Yick Fung, Fresno	Westinghouse	8.50
Bill's Cafe, Bakersfield	Frigidaire	3.44
Hospitals		
During 1935		
Burnett Sanitarium, Fresno	General Electric	6.75
Mercy Hospital, Merced	Frigidaire	1.10
1936		
Sanger Hospital, Sanger	Westinghouse	8.50
Dearborn Clinic, Madera	.....	18.00
West Side Hospital, Taft	.....	6.00
Hotels		
1936		
Merced Hotel, Merced	Carrier	73.00
Savoy Hotel, Taft	P. & R.	13.00
Mortuaries		
Prior to 1935		
Stevens & Bean, Fresno	Westinghouse	8.50
1936		
Paso Robles Funeral Home, Paso Robles	Frigidaire	2.00
Madera Mortuary, Madera	Westinghouse	6.00
Offices		
Prior to 1935		
San Joaquin L. & P. Co., Fresno	York	235.00
T. W. Patterson Building, Fresno	Carrier	247.00
Dr. P. S. Ching, Fresno	Frigidaire	1.00
Valley Chevrolet Co., Bakersfield	Frigidaire	3.00
Dr. T. T. Yatabe, Fresno	General Electric	.50
Dr. P. R. Sutton, Los Banos	General Electric	.50
Physicians' Building, Fresno	Ice	3.00
During 1935		
Dr. R. B. Curyea, Coalinga	General Electric	.50
Dr. P. S. Ching, Fresno	Frigidaire	2.75
Danish Creamery, Fresno	York	6.00
Sanger Telephone Exchange, Sanger	P. & R.	1.00
Peerless Bean Co., Fresno	P. & R.	1.75
Producers Cotton Seed Oil Co., Fresno	Frigidaire	6.50
S. J. L. & P. Corp., Bakersfield	P. & R.	11.00
Dr. Wallace, Fresno	Kelvinator	11.00
Assets Corp., Fresno	Frigidaire	3.50
State Dept. of Public Works, Fresno	York	3.50
Dr. Edward Brigham, Dinuba	Carrier	4.50
Brix Building, Fresno	Sturtevant	40.20
1936		
Kyle Co., Fresno	Frigidaire	3.25
Dr. Mudd, Merced	Frigidaire	1.25
Helm Building, Fresno	Carrier	90.00
Better Buy Grocery, Fresno	Cyclops	5.50
Taylor-Wheeler, Inc., Fresno	General Electric	3.75
George Haberfeldt, Inc., Bakersfield	Frigidaire	1.25
Standard Oil Co., Taft	Frigidaire	1.25
Fresno Guar. Building & Loan, Fresno	Westinghouse	8.25
Mason Building, Fresno	Frigidaire	75.00
Cory Building, Fresno	York	65.00
Bekins Van & Storage, Fresno	Cyclops	2.50
Sand Stone Brick Co., Bakersfield	P. & R.	1.75
Black, Moffett & Town, Fresno	Westinghouse	3.50
Residences		
Prior to 1935		
Dr. P. S. Ching, Fresno	Frigidaire	3.25
George Bowman, Fresno	Frigidaire	1.00
H. B. Lenard, Fresno	Frigidaire	1.50
E. J. Roper, Woodlake	Frigidaire	1.50
H. H. Courtwright, Fresno	General Electric	3.50
Dr. F. L. R. Burk, Fresno	General Electric	5.75
Burton Todd, Fresno	General Electric	3.75
Harry Balfe, Clovis	General Electric	.50
H. H. Sutton, Fresno	General Electric	.50
L. G. Jeffery, Fresno	Westinghouse	2.00
Claude Rowe, Fresno	York	1.00
Frank Thomas, Fresno	Frigidaire	1.60
J. B. Carter, Fresno	Frigidaire	1.60
L. W. Henderson, Selma	Frigidaire	1.60
E. P. Smith, Fresno	Frigidaire	1.60
Dennis Wheeler, Fresno	Frigidaire	1.60
Carlos R. McClatchy, Fresno	Frigidaire	7.00
During 1935		
M. E. Christensen, Taft	P. & R.	.50
A. Christensen, Sanger	P. & R.	3.00
R. V. Smith, Fresno	Westinghouse	.50
L. E. Wier, Corcoran	Frigidaire	3.25
R. M. Wood, Sanger	P. & R.	.25
L. W. Sanders, Bakersfield	P. & R.	3.25
P. S. Ching, Fresno	Frigidaire	3.50
C. M. Cornell, Fresno	.....	.75
Bert Zook, Fresno	Frigidaire	3.50
Dr. S. W. Walker, Fresno	Frigidaire	3.50
Fred Aggin, Taft	P. & R.	1.00
Dr. H. A. Jacobson, Fresno	Westinghouse	5.50
A. S. Crites, Bakersfield	Frigidaire	3.50
Max Himovitz, Bakersfield	Carrier	2.50
1936		
E. J. Donie, Dinuba	Frigidaire	2.25
George Haberfeldt, Bakersfield	Frigidaire	4.00
Dr. McPheeters, Fresno	Westinghouse	3.50
LeRoy Gorden, Bakersfield	Super Cold	3.50
James Curren, Bakersfield	P. & R.	.....
P. E. Turner, Bakersfield	P. & R.	1.00
Dr. K. S. McKee, Bakersfield	P. & R.	2.00
T. A. Peters, Bakersfield	P. & R.	.75
H. E. Clark, Taft	P. & R.	.95

Name and City	Manufacturer	Hp.
Recreations		
During 1935		
Realto Bowling & Billiards, Fresno	Frigidaire	24.00
Restaurants		
Prior to 1935		
Omar Khayyam, Fresno	Frigidaire	7.50
Tiny's Waffle Shop, Fresno	Frigidaire	3.50
Retail Stores		
Prior to 1935		
Harry Coffee, Inc., Fresno	Westinghouse	16.00
Harry Coffee, Inc., Bakersfield	Westinghouse	16.00
Westinghouse Stores, Fresno	Westinghouse	.50
During 1935		
Eastern Outfitting Co., Fresno	Frigidaire	5.20
Owl Drug Co., Bakersfield	General Electric	10.50
1936		
Rodder Shoe Co., Fresno	Frigidaire	3.25
Taft Furniture Co., Taft	.....	1.24
Leed Shoe Store, Fresno	York	9.00
New City Cleaners, Bakersfield	.....	.87
Grace Dalbridge, Bakersfield	P. & R.	3.25
Welds Department Store, Bakersfield	P. & R.	15.50
Pernot & Rich, Fresno	P. & R.	1.00
Theaters		
During 1935		
Majestic, Fresno	.....	4.50
Court, Livingston	Frigidaire	12.00
Fox-Wilson, Fresno	Carrier	87.00
Fox, Bakersfield	Carrier	38.00
1936		
Merced Theater, Merced	Carrier	150.00
Fulton, Fresno	Ice	5.50
Selma Theater, Selma	Westinghouse	25.00

Miama, Fla., Installations in 1936 Only

(Information Supplied by the Florida Power & Light Co.)

Name and Type of Business	Installed by	Tonnage	Hp.
Banks			
M. B. Federal S & L Association	Carrier	2.42	3.21
First National Bank	Carrier	31.6	40.67
Offices			
F. Rank	General Electric	1.62	2.01
C. A. Moorehead	General Electric	1.5	1.62
Crandon Drug Co.	Carrier	.75	.77
Hector Supply Co.	Carrier	.75	.77
Orange State Oil Co.	Carrier	12.5	13.67
H. B. Peacock	De La Vergne	1.16	1.75
First National Bank	Carrier	4.5	4.62
Norge Nestor Co.	De La Vergne	1.5	2
M. L. Hampton	Ilg	.5	....
W. N. Herod Co.	Fairbanks-Morse	....	....
Residences			
D. Mahoney	York	.63	.77
B. R. China	General Electric	1.62	3.33
F. W. Borton	Kelvinator	1.5	2.02
Mrs. Virginia Mays	Westinghouse	.58	.52
John Semon	York	.63	.77
E. Polevitzky	York	.63	.77
A. R. Merrill	Carrier	.75	.77
Fred J. Harley	Carrier	.75	.77
Sailing Baruch	Carrier	.75	.77
Mrs. J. O. Horning	Carrier	7.4	8.42
C. J. Daugherty	Kelvinator	....	....
A. W. Chappell	Ilg	....	....
Clarence Nelson	York	3.14	3.29
Restaurants & Bars			
Whitman Hotel Kitchen Pantry	Frigidaire	.75	.77
Pancoast Hotel Rooms and Bar	Airtemp	17.8	25.63
5 O'Clock Club	Bryant	13.33	25
Wellon's Tavern	General Electric	10.7	12.5
Stores			
Duval Jewelry Co.	General Electric	5	10
Capital Dress Shop	York	4.9	6.5
Liggett's Drug Store	York	20	23.62
Boyd's Shoe Store	Carrier	7.5	8.12
Frederick's Market	Frick	15	17.5
Breeding's Drug Store	General Electric	16.5	17.5
David Alan Men's Shop	General Electric	16.5	17.25
Miscellaneous			
Eastern Airlines Instrument Room	Frigidaire	2	2.17
Combs Funeral Home	York	.63	.77
Southern Bell Telephone Co. (Apparatus Room)	Frigidaire	5	8
Colony Theater	Carrier	53	72
Memorial Hospital Operating Room	Carrier	.75	.77
Rosetta Theater	General Electric	45	48
Capital Theater	General Electric	67.5	80

1936 Installations in Reno, Nev.

(Data Supplied by Sierra Pacific Power Co.)

Name and Type of Business	Installed by	Tonnage	Hp.
Bank Club	General Electric	27	35
Columbo Hotel Grill	General Electric	7	5
First National Bank	Westinghouse	16	15
Granada Theater	Carrier	65	55
Majestic Theater	Carrier	65	55
Town House Club	Carrier	6	5
Silver Grill Cafe	Carrier	6	5
Wigwam Cafe	Carrier	4	3
Colbrandt Cigar Store	Frigidaire	3	3

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REFRIGERATION PARTS CO.
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Business Up 52 1-2% With Conditioning, Letter Reports

DAVENPORT—A 52½% increase in business over 1935, following installation of Kelvinator air conditioning, is reported by the Neumode Hosiery Store at Cedar Rapids in an unsolicited letter to Mueller Lumber Co. here, Kelvinator commercial distributor in this territory.

R. Karlowa of the hosiery shop says that the store expected a drop in business with the coming of hot weather, only to have business jump 71% the day the cooling equipment was put into operation. Four neighboring merchants, noting the the success of the system, are planning to condition their stores, Mr. Karlowa states.

The complete letter to the Mueller company, dated July 27, follows:

Text of Letter

"We wish to express our satisfaction with the Kelvinator air conditioning equipment you installed for us in the Neumode Hosiery Store, at Cedar Rapids, Ia.

"The installation has more than fulfilled the specifications. We have a nice even temperature at all times, and never experience any difficulty in maintaining the store 15 degrees cooler than the outside temperature.

"During the record breaking days in July, we were able to keep our store open and operating as profitable as in normal temperatures, while many other stores were obliged to close because of the heat. In fact, our girls are at the store early and stay late, rather than leave the cool store for overheated homes.

Temperature Near 80°

"At one time, when the temperature just outside the door was 116 degrees, we were able to bring our store temperature down to 73 degrees even through the usual run of customers coming and going. However, we never keep such a great differential, as it is much too cool for health and comfort of those who must go out into the heat. We find that 80 to 82 degrees is the best temperature for the store at most times, which eliminates any danger from heat shock when leaving the store, and which the salesladies say is comfortable to work in.

"We have been running an unusual increase in sales this year, about 52½% over 1935, but fully expected a recession in business when the last heat spell came along. Unusual as it may seem, we have averaged 71% increase starting with the day the cooling equipment went in operation.

Customers Linger

"This does not mean that 1935 in July was poor, but to the contrary, we had a very good July last year without any decline in the business trend. We firmly believe that we are doing more business because the customer is comfortable and does not hurry her purchases. Many linger in the store, and in many instances make additional purchases by seeing articles they would have missed had they hurried out.

"When the summer is completed, I will send you a chart showing the business curve for 1935 and 1936, and I am sure you will be interested to see what happened to the 1936 curve from the time the cooling system went into operation. The first four weeks of this July indicate that our sales will be as large as June. Usually the recession amounts to about 20%.

"My personal opinion of air cooling stores is that in another two years, or rather just one more heat spell like the last, and the store that does not air cool is done, and might as well wrap up for the summer months. Since our system was installed, four stores adjacent to ours are making plans to air cool.

"If we can at any time help you in convincing a prospect of the desirability of air cooling and the efficiency of Kelvinator, do not hesitate to call on us."

VIRGINIA SMELTING CO.
WEST NORFOLK VIRGINIA
EXTRA DRY
ESOTOO
LIQUID SULPHUR DIOXIDE
V-METH-L
VIRGINIA METHYL CHLORIDE
131 State St. Boston—76 Beaver St. New York

TEMPRITE
INSTANTANEOUS
BEER and WATER COOLERS
Detroit Michigan

Mechanical Air-Conditioning Equipment Installed in Sioux City, Iowa Before Sept. 1, 1936

(Data Supplied by Sioux City Gas & Electric Co.)

Offices

Prior to 1935			
S. C. Gas & Electric Co.	York	11½	
S. C. Gas & Electric Co.	Frigidaire	10½	
D. K. Baxter Co.	Frigidaire	3½	
Call Bond & Mortgage Co.	Frigidaire	3½	
During 1935			
Haley Neeley	York	11½	
Tolerton Warfield	Baker	17	
Malone & Moles	Carrier	3½	
Dr. John Henkin	Carrier	3	
Davenport Cleaners	Baker	3½	
Swift & Co.	Carrier	11½	
Naftzger & Gittens	Frigidaire	2	
Lytle Construction Co.	Bryant	1¼	
1936			
D. K. Baxter Co.	Frigidaire	3	
Dr. Katherman	Frigidaire	1½	
Tribune Co.	Frigidaire	1	
Dr. O'Donoghue	Frigidaire	3	
Wright Building	Carrier	¾	
American Serum	York	3	

Restaurants, Bars, & Night Clubs

Prior to 1935			
Stoup & Schaefer	Frigidaire	6	
Warrior Hotel	York	22	
Gantz Cafe	Sterling	5½	
Phillips Cafeteria	York	11½	
Martin Hotel	Frigidaire	3	
1936			
Orpheum Cafe	Westinghouse	19	

Theaters

Prior to 1935			
Orpheum Theater	Brunswick-Kroeschell	300	
Capitol Theater	Wittemeier	125	

Stores

Prior to 1935			
Sally Frocks	Frigidaire	5½	
Williges Furrier	Vilter (2 units)	20	
S. C. Optical Co.	Frigidaire	3½	
During 1935			
Weinbergs	Carrier	6	
Toller Drug Co.	Frigidaire	11½	
1936			
Thorpe & Co.	Frigidaire	5	
Grayson	Frigidaire	5	
Crescent Jewelry Co.	Frigidaire	5	
Kresge 5 and 10 Cent Store	York-Liberty	30	
Kresge $1.00 Store	York-Liberty	22	
Skaggs System	Carrier	7½	
Skaggs System	Carrier	7½	
Skaggs System	Westinghouse	21½	
J. C. Penny	Westinghouse	11½	
Council Oak No. 4	Frigidaire	7½	
Council Oak No. 2	Frigidaire	5½	
Fishgalls	Carrier	10½	

Residences

Prior to 1935			
D. K. Baxter	Frigidaire	2½	
George Call	Westinghouse	2½	
R. H. Atherton	General Electric	3	
Jos. Thompson	Frigidaire	½	
1936			
Cy Manning	Carrier	¾	
Harold Hathaway	Frigidaire	1½	
Imo Apartments	Carrier	¾	
J. Kelly	General Electric	1½	
E. Kelly	General Electric	1½	
Dr. Cody	Westinghouse	1½	
R. F. Roach	Frigidaire	¾	

Barber Shops and Beauty Shops

1936		
Warrior Beauty Shop	Carrier	3
Warrior Barber Shop	Frigidaire	3
Sanitary Barber Shop	Frick	1½

Miscellaneous

1936		
Empire Club	Frigidaire	5½
Nelson & Kampmeyer	Frigidaire	11½
War Eagle Bowling Alley	Westinghouse	7½

St. Joseph, Mo., Conditioner Installations

(Data Supplied by St. Joseph Railway, Light, Heat & Power Co.)

Hotels

Prior to 1935			
St. Francis	Frigidaire	10	10
During 1935			
Robidoux	Westinghouse	20	25

Industrial

Prior to 1935			
Chase Candy Co.	Carrier	30	40
1936			
Chase Candy Co.	Carrier	10	15

Residences

During 1935			
A. J. Seitz	Frigidaire	⅝	¾
Robert Knight	Frigidaire	¾	1
P. M. Lyons	Frigidaire	¾	1
O. Strucksberg	Frigidaire	¾	1
Dr. Kearby	Carrier	¾	1
1936			
Byron Case	Frigidaire	¾	1
Isadore Hassenbusch	Frigidaire	3	4
E. C. Holley	Frigidaire	¾	1
W. A. Seaman	Frigidaire	¾	1
Dr. Frommer	York	¾	1

Restaurants & Cafes

During 1935			
Stockman Tavern	Carrier	3	3
Brown Derby Tavern	General Electric	7½	10
1936			
Jerome Cafe	Baker	3	3
Sanitary Lunch	Carrier	7½	7½

Stores

During 1935			
Keller, The Furrier	Carrier	1½	1½
Maxwell Jewelry Store	Airtemp	3	3
1936			
J. C. Penney Co.	Frick	50	60
Walpole Drugs	Carrier	10	10
E. M. Watson	Carrier	7½	7½
Optician Jewelry	Carrier	3	3
Keller Furrier	General Electric	5	5

Theaters

Prior to 1936			
Missouri	Carrier	75	100
Electric	Fisher	30	40

Miscellaneous

During 1935			
Freeman Funeral Home	General Electric	10	10
Meierhoffer's Funeral Home	Frigidaire	10	10
Steve's Beauty Salon	Carrier	3	3
1936			
First National Bank	Frigidaire	3.4	1

Danger to Vaccines & Sera Shown by Query

NEW YORK CITY—Millions of Americans are endangered annually by vaccine and sera which have become ineffectual or actually harmful through deterioration due to lack of proper refrigeration, it has been revealed by medical, public health, and pharmaceutical authorities queried by Kelvinator Corp.'s Temperature Research Foundation.

Mechanical refrigeration was revealed by the survey to be the most satisfactory means of preserving sera, toxins, anti-toxins, vaccines, and antigens, as well as pathological specimens, essentials oils, pharmaceutical preparations, and organic products.

Medical authorities agreed that biological products which have deteriorated because of inadequate temperature control not only fail to achieve the desired result, but in many cases can be actually harmful.

Uncontrolled refrigeration does not insure preservation of biologicals, for cold, under certain conditions, may be as damaging as heat. Temperatures ranging from 32 to 42° F. are recommended for storage puposes.

Authorities contributing to the survey agreed that adequate electric refrigeration should be employed not only in hospitals and biological laboratories, but in the offices of private practitioners and druggists as well.

Wm. Doll Opens Danbury Hotpoint Dealership

DANBURY, Conn.—New G-E Hotpoint dealership and appliance shop has been opened at 98 White St. by William A. Doll, who purchased the electric appliance stock of Fischer-Waterman, Inc. Mr. Doll has been connected with Danbury furniture stores for the past 25 years, during which period he has handled several lines of appliances.

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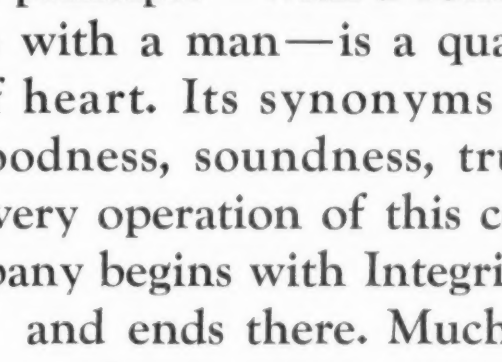

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H. J. KRACKOWIZER, President
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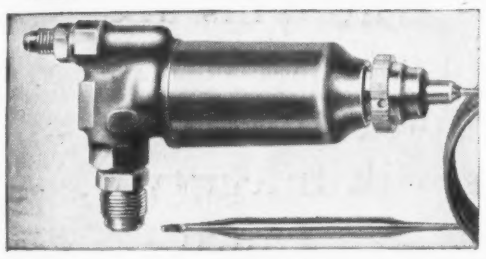

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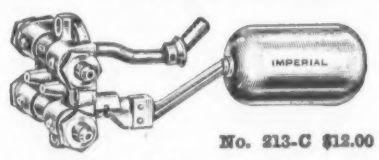

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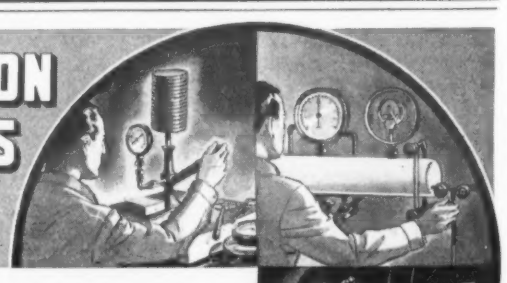

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Ask for New Refrigeration Catalog

The new catalog describes the Marsh Zero Adjustment Feature (patent pending) which assures perfect accuracy at every reading. It shows why you can safely standardize on Marsh Gauges and Instruments.

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Air Conditioning Made Easy

By F. O. JORDAN

In last week's issue of AIR CONDITIONING AND REFRIGERATION NEWS was published the preface to *Air Conditioning Made Easy*, a manual on air-conditioning engineering designed for practical use. In his preface, Author F. O. Jordan discussed the subject of "What Is Air Conditioning?"

In this week's issue is published the introduction to the book, and Section 1, definitions of terms used commonly in air-conditioning practice. Additional instalments of *Air Conditioning Made Easy* will appear regularly in AIR CONDITIONING AND REFRIGERATION NEWS.

SECTION NO. 1
Introduction

Purpose of the Air Conditioning Engineering Manual must be to develop and explain a method for computing the exact maximum load to which the air-conditioning equipment will be subjected upon any given project. Any such manual which deviates from this purpose to the extent of general theory, or which purports to be a complete academic course of study of all that might be included within the science of air conditioning, merely becomes just one more obstacle for the sorely tried air-conditioning engineer.

Any method of load computation and equipment selection must take into account and make proper allowance for all factors influencing the loads which the equipment is to carry, or affecting the performance of the equipment, provided that their influence is of a higher order than the probable error of the data upon which the computation and selection is based.

Furthermore, since the peak load which the equipment will be called upon to carry is the summation of only those loads that occur simultaneously, the method of computation must take cognizance of time elements and not merely load magnitudes only.

Moreover, the total load must be broken down into its constitutent parts of sensible and latent heat, and not only must the sensible load and the latent load be accurately determined, but the equipment and its operating conditions must be so selected that both of these loads are properly balanced by the sensible and latent capacities of the equipment.

Any method which fails in any of the above requirements will succeed only in keeping its user in trouble. However, any method which is so complicated that it bewilders or intimidates the non-technical salesman, or is so involved that it makes difficult the work of the experienced engineer, will result in a lower sales volume and failure for even the perfect air-conditioning equipment. For this reason the successful method must not be too complicated.

Somewhere between these two extremes lies the ideal method, a method which takes all important factors into consideration but which is easily understood and readily applied. Such an ideal method of procedure is our aim.

Since this method of procedure is for the use of the beginner as well as for the experienced engineer, it will be necessary to discuss briefly a few of the more important fundamental laws governing the conditioning of air for comfort. However, such discussion will be limited strictly to such laws the knowledge of which is deemed essential to a complete understanding of the methods of procedure to be set forth. In brief, our constant endeavor will be to adhere to the title: "Air Conditioning Made Easy."

SECTION NO. 2
Definitions and Simple Thermodynamics

Before a start can be made, an understanding of the air-conditioning language is essential. The terms commonly used may be defined briefly as follows:

AIR (DRY)—Air which contains no water vapor. Dry air is a mechanical mixture of approximately 78% nitrogen, 21% oxygen, and 1% various other gases.

POUND OF AIR—In referring to a "pound of air," a pound of dry air is always taken. For instance, "moisture per pound of air," "total heat per pound of air," "sensible heat per pound of air," "latent heat per pound of air," refers to the moisture, etc., per pound of dry air, not per pound of mixture.

AIR (SATURATED)—Air which contains all the water vapor possible at that particular temperature. When saturated, the dry bulb, wet bulb, and dew point temperatures are the same.

DRY BULB TEMPERATURE (DB)—The air temperature as indicated by the ordinary thermometer. At a given dry bulb temperature, the sensible heat in one pound of air above any reference point will be the same. Hence dry bulb temperature is the measure of sensible heat content.

WET BULB TEMPERATURE (WB)—The temperature as indicated by the ordinary thermometer whose bulb is encased in a clean fabric "sock" which is wetted with distilled water and exposed to an air movement until the indicated temperature has reached equilibrium. This point of equilibrium is the temperature at which the rate of sensible heat transfer from the air to the water on the wet bulb is equal to the rate at which heat is transferred from the wet bulb to the air by evaporation. For a given dry bulb temperature and relative humidity, the point of balance will be the same. At a given wet bulb temperature, the total heat in one pound of air above any reference point is the same. Hence wet bulb temperature is the measure of total heat content.

Now is the Time to Learn About Air Conditioning

Here are the first two sections of a complete book to be published serially in the NEWS. Read a few columns each week and you will soon have a clear understanding of this new field of opportunity.

DEW POINT TEMPERATURE (DP)—The temperature at which the water vapor begins to condense out of the air. At a given dew point temperature the weight of water vapor in the air is the same. Hence dew point temperature is the measure of moisture content.

WET BULB DEPRESSION (WBD)—The difference between the dry and wet bulb temperatures at any given condition.

DEW POINT DEPRESSION (DPD)—The difference in dew point temperature between the air in the conditioned space, and the air as supplied to the conditioned space from the air-conditioning unit. Usually 1° DPD is equal to about .0003 pounds of moisture removing capacity per pound of air circulated. For the usual project, a DPD of 5 to 10° is necessary, depending upon the ratio of latent to total load.

MOISTURE, OR ABSOLUTE HUMIDITY (M)—The weight of moisture in the form of water vapor which is contained in one pound of air.

RELATIVE HUMIDITY (RH)—Relative humidity is the ratio of the weight of moisture contained by a sample of air, to the weight of moisture which it would contain if saturated at that temperature and pressure.

HEAT (H)—The form of energy whose intensity is measured as temperature by the ordinary thermometer.

The B.t.u. is the usual unit of measure of heat. This is generally defined as the amount of heat necessary to raise one pound of water 1° Fahrenheit. Flow of heat can take place only from a substance of higher temperature level to a substance of lower temperature level. This fact is the foundation upon which refrigeration is built.

SENSIBLE HEAT (Hs)—As applied to air conditioning, sensible heat is the form of heat, the removal or addition of which changes the dry bulb temperature of the air, without affecting its dew point temperature (hence absolute moisture content). Thus "Sensible Capacity" might be called "Cooling Capacity," as it is the capacity to cool. Sensible heat or capacity is measured in B.t.u. per hour.

LATENT HEAT OF VAPORIZATION (HL)—The heat which (without producing a change in temperature) must be added to a liquid to vaporize it, or which must be removed from a vapor to liquefy it. As applied to air conditioning, latent heat is the form of heat, the removal or addition of which changes the dew point temperature. Thus "Latent Capacity" might be called "Dehumidifying Capacity" as it is the capacity to remove moisture. Latent heat is measured in B.t.u. per hour.

TOTAL HEAT (HT)—The sum of sensible plus latent heats or capacities. Under the usual air-conditioning service, the evaporator "coil" must do both sensible and latent work. The condensing unit capacity must equal the total heat capacity of the coil, plus intermediate losses.

LATENT HEAT OF FUSION OR MELTING—The heat absorbed by melting ice. In changing a pound of ice at 32°, to water at 32°, 144 B.t.u.'s are absorbed.

VAPOR PRESSURE (VP)—The pressure exerted by the water vapor in the air. This pressure depends upon the dew point temperature of the air, being higher for higher dew point temperatures. Vapor pressure is of interest to the air-conditioning engineer because of the latent capacity of the air-conditioning coil depends very closely upon the differential between the vapor pressure corresponding to the average surface temperature of the coil, and the vapor pressure corresponding to the dew point temperature. In mixtures of air and vapor, the total pressure is the sum of the air pressure and the vapor pressure.

SATURATION TEMPERATURE—The temperature of the gaseous refrigerant when it contains no superheat. The saturation temperature bears a definite relationship to the pressure, always being the same for any given pressure for any given refrigerant.

REFRIGERANT TEMPERATURE (RT)—The refrigerant temperature ordinarily referred to in air conditioning is the average temperature of the refrigerant within the air-conditioning coil. When controls are properly adjusted, this temperature may be taken as the saturation temperature of the refrigerant used which corresponds to the average refrigerant pressure within the coil.

COIL TEMPERATURE (CT)—The average temperature of the tube and fin surfaces of which the coil is constructed. This temperature will be from 2° to 12° higher than refrigerant temperature, depending upon the ratio of primary to secondary surface of the coil, and upon the load. Any factor which tends to increase the load will tend to increase the temperature differential between refrigerant and average coil surface, due to the resistance to flow of heat through the coil surface.

AIR CONDITIONING—The world's most abused term. For the purpose of this manual, air conditioning is the art of regulating the temperature, humidity, cleanliness, and motion of the air within the conditioned space at the proper level for health and comfort. This involves both heating and humidification during the winter season, both cooling and dehumidification during the summer season, and both cleaning and circulation at all times.

AIR CONDITIONING UNIT—For the purpose of this manual, an air-conditioning unit is the combination of filter, air-conditioning coil, fan, fan motor, and housing which is to be used for conditioning air for comfort.

AIR CONDITIONING COIL—The fin and tube unit in which refrigerant is evaporated by direct expansion or through which water or brine is circulated in contact with the coil surface.

EVAPORATOR—A direct expansion coil, either when used in the air stream as an air-conditioning coil or when used for cooling water for an indirect system.

CONDENSING UNIT—The combination of compressor and condenser which is used for drawing refrigerant from an evaporator, condensing it, and feeding the resultant liquid refrigerant back to the evaporator.

REFRIGERANT — This may be either the refrigerant which is evaporated within the direct expansion coil, or the water or brine which is circulated through indirect air-conditioning coil.

COMFORT ZONE—The range of temperature and humidity throughout

(Concluded on Page 13, Column 1)

"Air Conditioning Made Easy"

(Concluded from Page 12, Column 5)

which the average person is comfortable. Although it is agreed that both temperature and humidity have a very important effect upon comfort, "expert" opinion varies so greatly upon the precise conditions for maximum comfort and upon exact causes and effects, that definite statements serve merely as signals for the argument to begin all over again.

Furthermore, current outside conditions and individual temperament affect comfort conditions so greatly that such statements are not only impossible to defend, but of doubtful truth at best. However, our experience and common opinion indicate that air conditioning design based upon certain conditions have resulted in satisfaction and that the satisfactory inside condition is influenced by outside conditions and by the type and duration of occupancy. Table No. 2, in the Data Section, tabulates such known conditions.

How the Human Body Loses Heat

The human body loses heat in various ways, as follows:—

1. *By transmission due to the temperature differential between the body surface temperature, and the surrounding air temperature.*

If this differential is allowed to become too great, the loss of heat is so rapid that a sense of cold is noted. The differential at which an uncomfortable sense of coolness becomes evident varies with the season, a greater differential being permissible during the winter season because of the fact that the body is accustomed to lower temperatures during that season.

When the differential between the body and the surrounding air temperature is allowed to become too small, the loss of heat is so slow that an uncomfortable sense of warmth is noted. This differential varies with the season, a smaller differential being mandatory during the summer season because the body is accustomed to higher temperatures during that season. Furthermore, a certain sense of shock or contrast is inevitable upon leaving and entering the conditioned space.

For all of these reasons, comfort demands higher dry bulb temperatures within the conditioned space during the cooling season than during the heating season.

The duration of occupancy also has considerable influence upon the dry bulb temperature which is conducive to the greatest comfort. During the cooling season, when the occupancy period is short so that the entrances and exits of the occupants are made more frequently, the phenomena of shock or contrast become more important, while the sensation of the occupant when within the conditioned space becomes of less importance. A higher temperature is more comfortable when the occupancy period is short, because the body is accustomed to the yet higher outside temperature.

Therefore, the temperature in the conditioned space should be carried higher for the shorter occupancy periods. Conversely, lower temperatures must be maintained within the conditioned space for the longer occupancy period, because the importance of shock becomes less (since the conditioned space is entered and left less frequently), and because the importance of direct transmission of heat from the body becomes greater.

2. *By latent heat of evaporation of perspiration from the body surface.*

Other factors being equal, the cooling effect of such evaporation decreases with a rise in humidity level of surrounding air. If the moisture content of the air surrounding the body is allowed to rise to a level at which the evaporation of perspiration is retarded, the body is made to feel warmer. However, if the moisture content is held at a level at which evaporation is considerable, the apparent temperature is reduced.

In the winter, a lower (hence more economical) dry bulb temperature may be maintained within the conditioned space without discomfort, if the humidity is not allowed to fall to a level at which the evaporation of body moisture is too rapid.

In the summer, a higher (hence more economical) dry bulb temperature may be maintained without discomfort, if the humidity is not allowed to rise above a level at which the evaporation of body moisture is retarded too greatly.

Thus, summer comfort may be maintained at a higher dry bulb temperature within the conditioned space if humidity is properly controlled. Obviously, under such a condition the sense of shock at entering and leaving the conditioned space is materially reduced, because the sudden temperature change is reduced.

3. *By convection.*

The passage of air currents over the surface of the body produces a sense of coolness because the resultant scrubbing action carries away the body heat more rapidly, and because the rate of evaporation of body moisture is increased. Other factors being equal, the sense of coolness increases with the velocity of the air currents.

During the cooling season all possible advantage should be taken of this cooling effect by maintaining a good circulation of air throughout the conditioned space. In fact, good year-round circulation is essential to prevent stagnation.

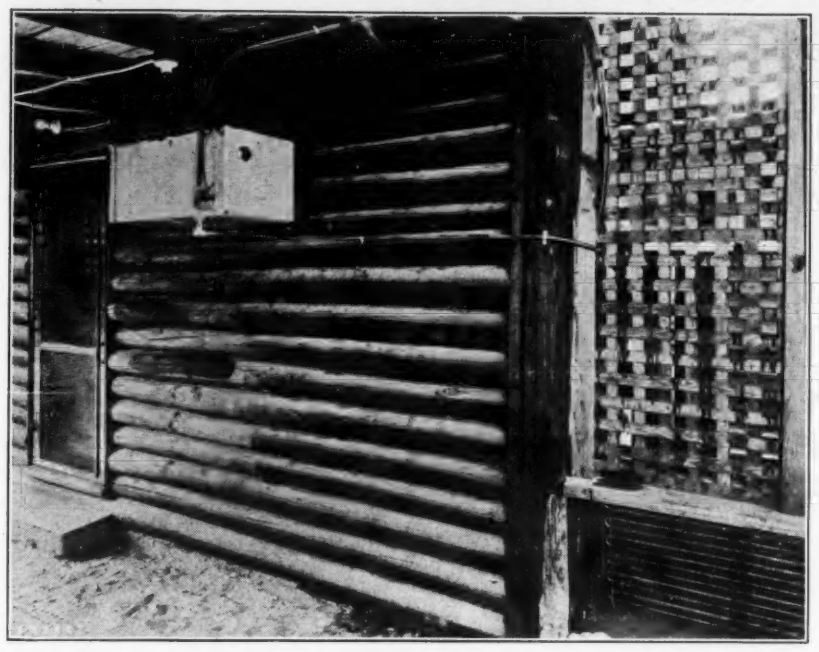
However, perceptible "drafts" must be avoided at all costs, since they may be the cause of actual discomfort. Although air velocities above the occupancy zone where the airstream cannot come in contact with the occupants, may be much higher (see Table No. 19), in general air velocities in the occupancy zone should not exceed 90 f.p.m.

HIGH SIDE—LOW SIDE—The refrigeration system is divided into a high pressure section which is known as the "high side" and low pressure section which is known as the "low side."

The "high side" consists of that portion of the system between the compressor and the expansion valve, including the high pressure refrigerant gas line from the compressor to the condenser-receiver, the condenser-receiver itself and the liquid refrigerant line from the condenser-receiver to the expansion valve.

The "low side" consists of that portion of the system between the expansion valve and the compressor, including the evaporator (or air conditioning coil) and the suction line or low pressure gas refrigerant line from the evaporator. The crankcase of the compressor and that portion of the compressor cylinder space which is below the piston, are part of the low pressure section.

Comfort for Tourists in Georgia



Kelvinator air conditioner installed outside of tourist cabin in a camp at Augusta, Ga.

* * *

Georgia Tourist Camp Plans to Extend Use Of Air Conditioning

AUGUSTA, Ga.—Tried out in eight of the 25 cabins in the Augusta Touring Camp here, air conditioning has proved such a profitable improvement that operators of the camp are planning to air condition all of the cabins next year.

The Kelvinator air-conditioning equipment, installed somewhat as an experiment, scored an instant hit with the touring trade. The operators figure the improvement will pay for itself because a dollar is added to the rental charge for the air-conditioned cabins.

Installations for these cabins are somewhat unusual. The air conditioner itself is attached to the wall on the outside of the cabins, the conditioned air being supplied to the interior of the cabin by a small duct. Condensing units are housed in a special place outside the cabins.

G-E Introduces New Line of Motors

SCHENECTADY—A new design of riveted-frame, squirrel-cage, polyphase induction motors, in frame sizes of from one to 15 hp. at 1,800 r.p.m., has recently been placed on the market by General Electric Co. The new motors incorporate improvements in stator-coil insulation, frame construction, and other design features.

Co-ordination of design, it is claimed, permits the different modifications of motors in the line to be used interchangeably for many types of power supplies and for various applications. Thus many special requirements may be met with the standard available line.

A new insulation system "built from the inside out" is employed for the stator-coil windings, which are of the random-wound type, with joints at the connections fused instead of soldered. Recently developed insulating materials and processes are utilized, eliminating the need for taping the end windings and producing an insulation assembly with high resistance to moisture, mild acids, alkalis, oil, and abrasion, the company reports.

A new riveted-frame construction and new end frames made of malleable iron, with integrally cast feet, are used. Cast-iron end shields maintain accurate bearing alignment and uniform air gap.

Convenience features include: two-part conduit boxes that provide ready access to leads and can be mounted in any one of four positions; knock-off ledges on end shields, permitting easy disassembly; ball bearings provided with pressure grease fitting and relief plug; and sleeve bearings equipped with oil filler gauge that can be placed on either side of housing.

Cooling Boosts Volume 30% for Food Stores

SIOUX CITY, Iowa — Customary drop in food sales volume due to temperature rises during the summer months was forestalled this year by the O. P. Skaggs Stores here.

Since a 17-ton Westinghouse air-conditioning system was installed last spring sales instead of declining have increased 30%. Summer business set new all-time records. New customers were attracted to the cool comfort of "Skaggs," and old customers made more frequent visits, the management reports.

Notable improvement in the health and efficiency of employes also was effected. This improved personnel has meant less overhead cost—a substantial return on the air-conditioning investment.

Installed by Electric Engineering Co., the system has performed admirably, maintaining an interior temperature of 80° with 50% relative humidity against temperature above 100° outside the store.

Coca-Cola Offices in Indiana Cooled

WASHINGTON, Ind.—F. F. Osmon, Servel distributor in this territory, has installed Servel air-conditioning equipment in Coca-Cola distributing company offices in this city and in Jasper, nearby.

Dealer Shows Conditioners In Own Home

SAVANNAH, Ga.—Practicing what he preaches, Raymond M. Kuhr, sales manager and partner in Southern Specialty & Fixture Co., here, recently had his own home equipped with Westinghouse air conditioning.

Mr. Kuhr claims two-fold profit from this investment. His own family not only enjoys the comfort which air conditioning affords, but his home now provides a practical demonstration of the equipment which he sells.

The Buyer's Guide

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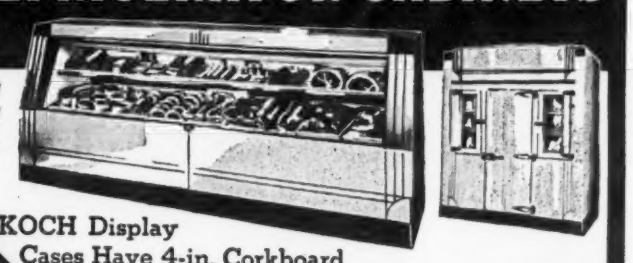

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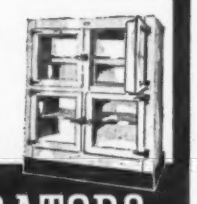

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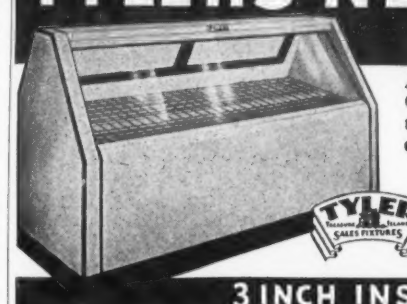

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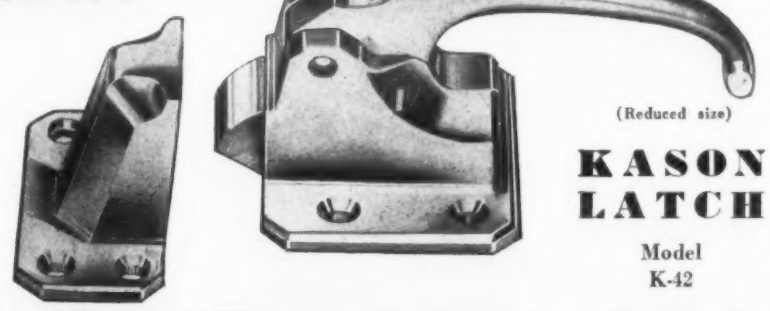

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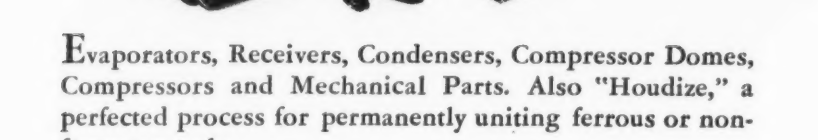

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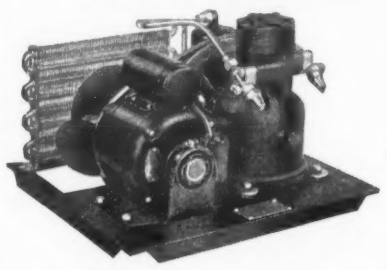

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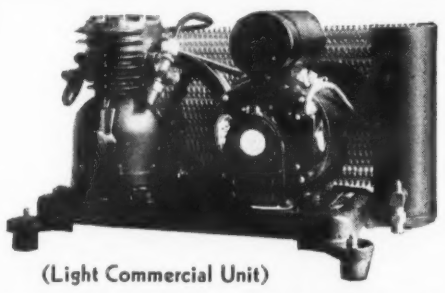

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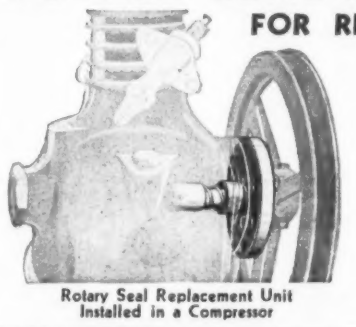

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Patents

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2,052,561. MEANS FOR INTERCHANGING COMPRESSOR AND CONDENSER FUNCTIONS OF A REFRIGERATING SYSTEM AND CONTROLLING A COMPRESSOR THEREFOR. Henry L. Galson, Philadelphia, Pa., assignor to Baldwin-Southwark Corp. Application May 31, 1933, Serial No. 673,742. 14 Claims. (Cl. 62—115)

2,052,580. MEANS AND METHOD OF REFRIGERATION. Bo Folke Randel, San Diego, Calif. Application Nov. 14, 1932, Serial No. 642,529. 19 Claims. (Cl. 62—119.5) (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

2,052,619. REFRIGERATING APPARATUS. Harold M. Graham, Buffalo, N. Y., assignor, by mesne assignments, to Ross Heater & Mfg. Co. Inc., Buffalo, N. Y. (1933) Application Aug. 12, 1932, Serial No. 628,522. 19 Claims. (Cl. 62—152)

2,052,635. METHOD AND APPARATUS FOR CONTROLLING LEVEL. George H. Leland, Dayton, Ohio, assignor of one-half to The Leland Electric Co., Dayton, Ohio. Application July 11, 1932, Serial No. 621,942. 7 Claims. (Cl. 236—74)

2,052,726. METALLIC ICE CREAM CONTAINER JACKET FOR REFRIGERATORS. Louis Schleier, New York, N. Y. Application Oct. 11, 1934, Serial No. 747,936. 3 Claims. (Cl. 220—9)

2,052,762. OIL SEAL. Remi J. Gits, Riverside, Ill. Application Dec. 14, 1935, Serial No. 54,385. 7 Claims. (Cl. 288—1)

2,052,769. REFRIGERATING SYSTEM. Anthony F. Hoesel, Chicago, Ill., assignor to Peerless Ice Machine Co., Chicago, Ill. Application Jan. 19, 1934, Serial No. 707,235. 6 Claims. (Cl. 62—4)

2,052,783. COOLING TOWER. Leon T. Mart, Johnson County, Kans. Application Aug. 12, 1935, Serial No. 35,837. 5 Claims. (Cl. 261—29)

2,052,822. RELEASING DEVICE FOR REFRIGERATOR ICE TRAYS. Max Hoffman Greene, Chattanooga, Tenn., assignor of one-half to John T. Clark, New York, N. Y. Application March 25, 1935, Serial No. 12,978. 1 Claim. (Cl. 62—108.5)

2,052,850. VALVE ATTACHMENT FOR HUMIDIFIER PANS. John L. Skuttle, Mason City, Iowa. Application Nov. 14, 1933, Serial No. 698,007. 2 Claims. (Cl. 137—68)

2,052,894 REFRIGERATING APPARATUS. Donald H. Reeves, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp. Application April 16, 1930, Serial No. 444,639. Renewed May 13, 1935. 9 Claims. (Cl. 236—92)

2,052,898. REFRIGERATING APPARATUS. Edmund F. Schweller, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio. Application April 5, 1935, Serial No. 14,788. 11 Claims. (Cl. 20—35)

2,052,969. AIR CONDITIONING APPARATUS. Arthur O. Edwards, Minneapolis, Minn. Application May 2, 1932, Serial No. 608,650. 15 Claims. (Cl. 257—8)

2,053,036. HEAT EXCHANGE APPARATUS. Edwin A. Jones, Milwaukee, Wis., assignor to L. J. Mueller Furnace Co., Milwaukee, Wis. Application June 21, 1935, Serial No. 27,629. 9 Claims. (Cl. 257—244)

2,053,037. HEAT EXCHANGR. William Lintern, Cleveland, Ohio. Application July 24, 1935, Serial No. 32,905. 16 Claims. (Cl. 257—246)

2,053,042. AIR CONDITIONING. Arthur J. Otto, Milwaukee, Wis., assignor to Johnson Service Co., Milwaukee, Wis. Application May 17, 1935, Serial No. 22,057. 2 Claims. (Cl. 257—9)

2,053,100. REFRIGERATING APPARATUS. Willard L. Morrison, Chicago, Ill., assignor to Dole Valve Co., Chicago, Ill. Application Aug. 31, 1932, Serial No. 631,138. 6 Claims. (Cl. 62—126)

2,053,117. REFRIGERATOR EVAPORATOR. Christian Steenstrup, Schenectady, N. Y., assignor to General Electric Co. Application Feb. 24, 1933, Serial No. 658,321. 20 Claims. (Cl. 62—126)

2,053,206. AUTOMOBILE AIR COOLING MEANS. John Allston Sargent, Bronxville, N. Y., assignor to Campbell Metal Window Corp., New York, N. Y. Application Sept. 6, 1933, Serial No. 688,291. 10 Claims. (Cl. 62—117)

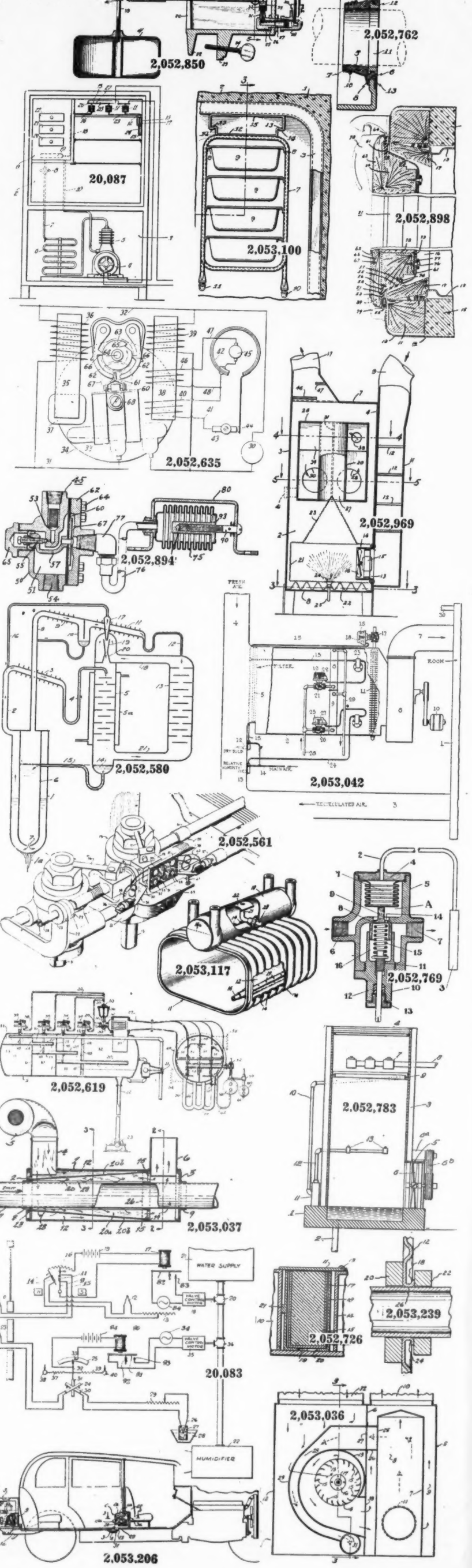
2,053,239. MANUFACTURE OF HEAT EXCHANGE APPARATUS. Joseph D. Forrer and Lewis R. Prough, Jackson, Mich., assignors to Acme Industries, Inc., Jackson, Mich. Application Oct. 5, 1934, Serial No. 746,953. 4 Claims. (Cl. 29—157.3)

* * *

REISSUES

20,083. AIR CONDITIONING CONTROL. Samuel M. Anderson and Robert T. Palmer, Sharon, Mass., assignors to B. F. Sturtevant Co., Boston, Mass. Original No. 1,881,992, dated Oct. 11, 1932, Serial No. 536,144, May 9, 1931. Application for reissue July 19, 1935, Serial No. 32,292. 22 Claims. (Cl. 236—44)

20,087. MEANS FOR DEFROSTING COOLING ELEMENT OF MECHANICAL REFRIGERATORS. John A. Dienner, Evanston, and John E. Gardner, Chicago, Ill., assignors to Richard Ford, Detroit, Mich. Original No. 1,942,412, dated Jan. 9, 1934, Serial No. 214,490, Aug. 22, 1927. Application for reissue Jan. 7, 1935, Serial No. 738. 24 Claims. (Cl. 62—4)



20,088. VENTILATING SYSTEM. Walter L. Fleisher, New City, N. Y., assignor, by mesne assignements, to Auditorium Conditioning Corp. Original No. 1,670,656, dated May 22, 1928, Serial No. 192,898, May 20, 1927. Application for reissue June 1, 1936, Serial No. 82,993. 25 Claims. (Cl. 236—44)
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PATENTS

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REFRIGERATION CONTROLS, domestic types, repaired. 48 hours. Ranco pencil types $1.75, all box types, $2.00. Majestic $2.50. UNITED GAUGE AND INSTRUMENT COMPANY, 436 West 57th Street, New York City.

Questions

Shepard Ice Cream Freezer

No. 2928 (Service Company, Colorado)—"We would appreciate any information you may be able to furnish as to where we could locate the manufacturer of Shepard's ice cream freezer.

"This is not an electric refrigerator, merely a 20-qt. pail type freezer, but we have not been able to locate this manufacturer and are quite anxious to secure some parts."

Answer: Shepard ice cream freezers are manufactured by North Bros. Mfg. Co., Lehigh Ave. and American St., Philadelphia, Pa.

York Manufacturer

No. 2929 (Newspaper, New York)—"I would appreciate it very much if you would send me the name of a refrigerator manufacturing company in York, Pa., which makes an air-conditioning unit designed especially for hay fever sufferers. I would also appreciate any additional particulars you might have about such a unit."

Answer: We believe you have reference to the York Ice Machinery Corp., York, Pa., which manufactures air-conditioning equipment.

Federal Excise Tax

No. 2930 (Manufacturer, Pennsylvania)—"We have had a question come up in connection with the Federal Excise Tax on domestic compressors for use in conjunction with the installation of electric water coolers.

"Is it necessary, from your experience, to have a certificate of exemption from the buyer covering domestic compressors for this type of application?

"We would appreciate your opinion in this connection as to the policy of other manufacturers."

Answer: We do not believe it is necessary for you to get a certificate of exemption from the buyer covering domestic compressors for electric water coolers, if such units are sold in good faith for use on water coolers.

However, one can never be certain on such matters. For authoritative information on this matter, we suggest you write to D. S. Bliss, Deputy Commissioner of the Bureau of Internal Revenue, who has made the most recent interpretations of the excise tax as it affects refrigeration business.

Niagara Refrigerator

No. 2931 (Manufacturer, Ohio)—"Can you give me any information about the Niagara refrigerator? I understand there is a refrigerator by this name being manufactured, and believe that it is made by one of the larger companies under this particular brand name, and distributed by a separate agency. However, I may be wrong in this assumption. However, I am particularly anxious to get all the information on it I can. Incidentally, if it gives you any lead, I believe that this Niagara refrigerator is securing a prominent place in the export market.

Answer: The Niagara refrigerator was manufactured by Heinz & Munschauer company of Buffalo up to last year. The editor did not come across it on his recent trip around the world.

Government Contract

No. 2932 (Manufacturer, Illinois)—"Can you advise where to obtain a copy of the specifications referred to in the September 2 issue, page 1, column 2, at foot of the column before the tabulation giving the ranking of the eight bids for this government housing refrigeration."

Answer: See below.

No. 2933 (Dealer, Texas)—"Please refer to your NEWS of week of Sept. 2, 1936.

"We are extremely interested in the editorial on the front page, headed 'Westinghouse Proposal ranks No. 1 in Bidding on 16,697 Refrigerators for Government Housing Projects.'

"If you could kindly furnish us with more specific information as to the specifications that the Government requested these refrigerators to be under during the operation period, we would greatly appreciate same. We are particularly interested in what temperature of the room these refrigerators were tested in—whether it was one certain temperature or a variance of temperatures, and how many tests were made to arrive at this operating cost.

"We have had many comments on this write-up and wish to assure you that any information you can give us with reference to the above will be most welcome."

Answer: Detailed information regarding the government specifications for the bidding on 16,697 refrigerators for government Housing Projects is given on pages 6 and 7 of the September 16 issue of AIR CONDITIONING AND REFRIGERATION NEWS.

Sales for 1932 and 1935

No. 2934 (Association, Illinois)—"We would like to know the number of household electrical refrigerators sold in 1932 and 1935 and the number of commercial units sold in these years."

Answer: 842,000 household refrigerators were sold in 1932 and 1,688,600 were sold in 1935. The 1932 figure for commercial refrigeration unit sales equals 83,100 machines, including machines up to 10 horsepower; while the 1935 sales of commercial machines equal 117,533, including only machines up to 1 horsepower.

Commercial Figures

No. 2935 (Manufacturer, Missouri)—"In your July 29, 1936, issue you published figures on commercial condensing unit shipments for June. This was shown on page 30, at the top of the page, right hand corner. This data is very helpful and we hope you continue to publish it.

"We are interested in learning something regarding the size of the machines included in items 1 to 12 inclusive. We wish to divide this data into fractional and integral. Can you offer some suggestions or discussion that will help us in making our decision as to just how they should be placed?

"The data on refrigerators, as coming from you, is one of the most complete groups of data that we have been able to get. We appreciate getting this at regular intervals."

Answer: We regret that we can offer no further breakdown on the figures which we publish.

We have put the question to the manager of the Nema refrigeration division and he says the reports made by the manufacturers do not show the size of the machines.

You might get a pretty good idea of how the sizes of the machines run to such equipment by asking the manufacturers, or by applying common industry knowledge of the equipment. For example, it would be safe to say that most of the beverage cooling and water cooling equipment use fractional horsepower units, while practically all the air conditioners will use equipment with motors of 1 hp. or greater.

Truck Refrigeration

No. 2936 (Manufacturer, Illinois)—"Kindly furnish me with a list of the various manufacturers of equipment for supplying refrigeration to insulated truck bodies."

Answer: See below.

No. 2938 (Manufacturer, Texas)—"Will you kindly send to us the names of manufacturers of refrigeration equipment for trucks and passenger cars?"

Answer: Manufacturers of equipment for supplying refrigeration equipment for trucks are listed on pages 208 and 209 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

The Buyer's Guide

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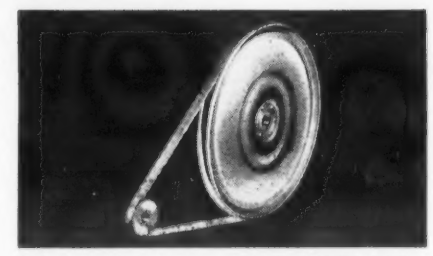

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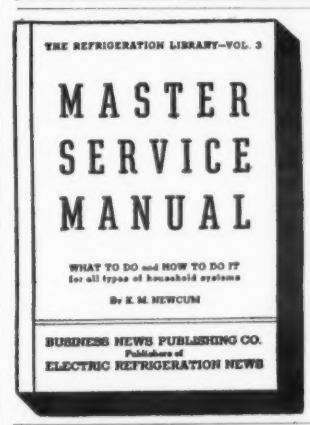
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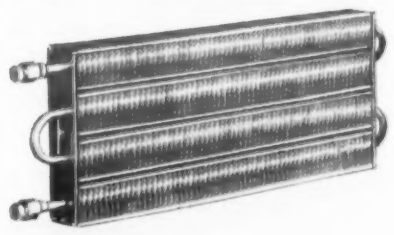

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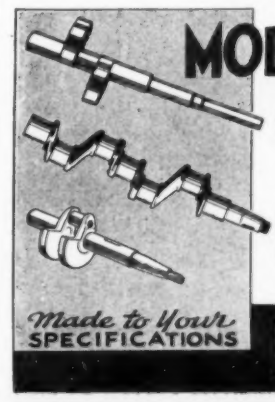

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